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LATIN AMERICA
A Geographical Survey

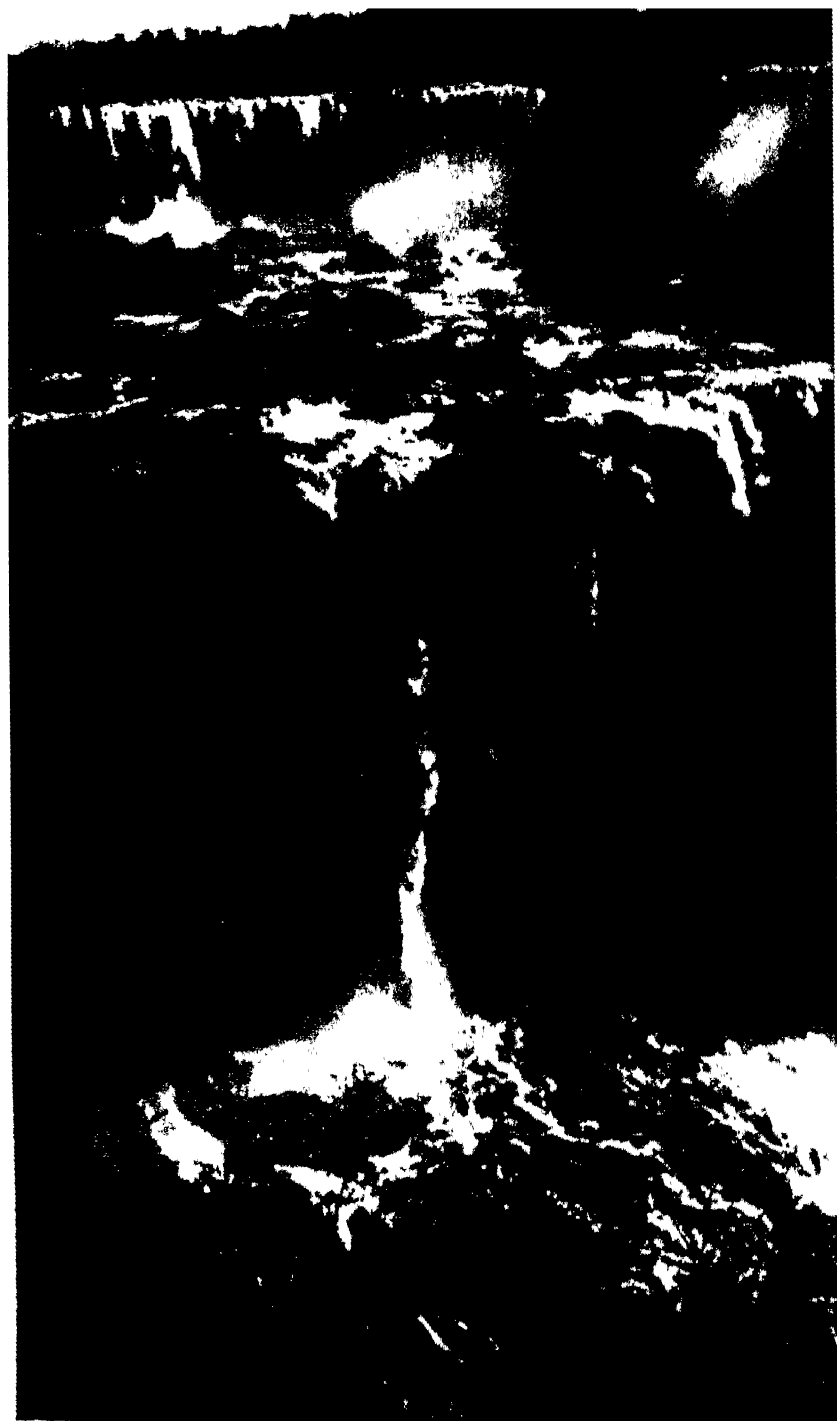


FIG. 1.—Iguassú Falls.

HARRY ROBINSON

LATIN AMERICA

A Geographical Survey



FREDERICK A. PRAEGER, *Publishers*

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BOOKS THAT MATTER

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PREFACE TO THE FIRST EDITION

THIS introductory study of Latin America is planned in two parts: an introductory part dealing with the general geographical framework of the region, the physical and cultural background, the resources, economy and communications, and some aspects of political geography, followed by a second and larger part which is concerned with the regional geography of the area, each country being dealt with in general, and then by regions.

A number of tables have been included, giving, so far as is possible, up-to-date information. Indeed, an effort has been made to make all the information as up-to-date as possible, since developments and changes are taking place with almost startling rapidity in practically every Latin American country. Maps have been kept simple: for this reason a good atlas should be used in conjunction with the text, especially since many place-names will be unfamiliar. Care has been taken in the choice of illustrations, and these usually illustrate specific things and matters of purely geographical interest. The writer believes that if photographic illustrations are used in a geographical text, then they should be geographically valid and pertinent and not a mere embellishment.

The writer has made frequent use of quotations. This has been done for two reasons: sometimes others are able to express things more adequately than one can oneself and, secondly, it is hoped that the reader will have his attention drawn to the writings of others.

In connection with the writing of this book, the author acknowledges his indebtedness to four works in particular: Professor Preston James' standard work, *Latin America*; Professor R. S. Platt's *Latin America*, invaluable for its sample studies; the *South American Handbook*, a subsidiary of Royal Mail Lines, which is a veritable storehouse of information concerning Latin America; and the *Statist Economic Survey of South America*. Grateful thanks are due to those authors and publishers who have given their kind permission to use quotations. These are acknowledged individually in the text. Also, the writer records with appreciation the helpful co-operation of the Editor of the *Times Review of Industry* for permission to reproduce three maps from that journal and to the firm of John Wiley & Sons, who granted permission for the reproduction of four maps from Charles M. Riley's *Our Mineral Resources*.

The author is happy to record his sincere thanks to friends and acquaintances for invaluable help and much kindness: to F. S. Hudson, B.A., F.R.G.S., who read the manuscript *in toto*; to Mr. and Mrs. Clive Haywood, who loaned many photographs and read critically the chapter on Colombia; to G. R. Seton for first-hand information about Amazonia and

North-eastern Brazil; to H. Alberto Tarifa of Bolivia for information about his homeland; and to Dr. J. E. Hanson and J. P. Cole, M.A., for their co-operation.

H. R.

October 1961

PREFACE TO THE SECOND EDITION

THE reception given to the first edition of this book has been very gratifying. The preparation of a second edition has provided the opportunity to make certain improvements in the text.

As in so many other parts of the world, important developments and changes have taken place in the Latin American region. It is too early to make any radical changes in the text, in fact these are not called for, but there has been a revision of parts of the book where significant changes have taken place, as, for instance, in the West Indies. The chapter on Argentina has been considerably expanded, and a short section on trade has been introduced in Chapter III. Figures have been brought up to date and in most cases they are the latest available.

All the maps of the first edition have been redrawn so as to give greater clarity and detail and the draughtsmanship has been greatly improved. Several new maps have been introduced. In addition, twelve new photographs have been incorporated in the text.

I am also indebted to my good friend F. S. Hudson, B.A., F.R.G.S., for his permission to use the cross-section of Mexico from his volume on North America. Finally, I would like to thank the Publishers for their efforts to improve the book and for making the above changes possible.

H. R.

November 1964

PREFACE TO THE AMERICAN EDITION

FOR this first American edition, population and production statistics have been brought up to date, some of the text has been revised to take account of recent changes in Latin America, and a new, more detailed bibliography has been prepared.

June 1967

CONTENTS

| <i>Chapter</i> | <i>Page</i> |
|---|-------------|
| PREFACE TO THE FIRST EDITION | v |
| PREFACE TO THE SECOND EDITION | vi |
| PREFACE TO THE AMERICAN EDITION | vi |
| LIST OF ILLUSTRATIONS | ix |
| LIST OF TABLES | xii |

PART ONE

THE GEOGRAPHICAL FRAMEWORK

| | |
|--|-----|
| I. THE PHYSICAL BACKGROUND | I |
| Location and Configuration | I |
| Structure and Relief | 5 |
| Rivers and Drainage | 13 |
| Weather and Climate | 17 |
| Natural Vegetation | 29 |
| Soils and Soil Erosion | 34 |
| II. THE HUMAN BACKGROUND | 42 |
| Racial Composition. | 42 |
| Population | 47 |
| Social Aspects. | 52 |
| III. RESOURCES AND ECONOMY | 63 |
| Features of the Economy | 63 |
| Land Utilisation | 69 |
| Mineral Resources | 76 |
| Industry and Manufacture | 86 |
| Transport and Communications | 90 |
| Trade | 98 |
| IV. POLITICAL GEOGRAPHY | 100 |
| The Political Pattern | 100 |
| Geopolitical Aspects | 106 |
| Political Problems | 111 |
| Regional Grouping | 117 |

PART TWO

THE REGIONAL PATTERN

| | |
|--|-----|
| V. THE CENTRAL AMERICAN MAINLAND | 120 |
| Mexico | 122 |
| Mexico: Regions | 140 |
| The Isthmian States | 154 |

| <i>Chapter</i> | <i>Page</i> |
|--|-------------|
| VI. THE WEST INDIES | 179 |
| Cuba | 181 |
| The Island of Hispaniola | 186 |
| Puerto Rico | 193 |
| The British Caribbean Federation | 195 |
| The French West Indies | 212 |
| The Netherlands West Indies | 213 |
| The Bahamas | 214 |
| VII. NORTHERN SOUTH AMERICA | 217 |
| Colombia | 217 |
| Venezuela | 236 |
| The Guianas | 256 |
| VIII. THE CENTRAL ANDEAN REPUBLICS | 264 |
| Ecuador | 264 |
| Peru | 275 |
| Bolivia | 300 |
| IX. THE BRAZILIAN CONFEDERATION | 321 |
| The Brazilian Background | 321 |
| The Geographical Regions | 344 |
| The South-eastern Heartland | 347 |
| The North-east Coastlands | 363 |
| The Dry North-east | 373 |
| Southern Brazil | 382 |
| The Interior Plateau | 391 |
| Amazonia | 400 |
| X. TEMPERATE SOUTH AMERICA | 416 |
| Argentina | 416 |
| The Regions of Argentina | 427 |
| Uruguay | 441 |
| Paraguay | 451 |
| Chile | 467 |
| The Falkland Islands | 484 |
| BIBLIOGRAPHY | 486 |
| INDEX | 493 |

LIST OF ILLUSTRATIONS

| <i>Fig.</i> | | <i>Page</i> |
|-------------|--|---------------------|
| 1. | Iguassú Falls | <i>Frontispiece</i> |
| 2. | Geographical position of Latin America | 4 |
| 3. | Structure of Middle America | 7 |
| 4. | Structure of South America | 9 |
| 5. | Cross-sections of Andes | 10 |
| 6. | Relief of South America | 11 |
| 7. | Drainage systems. | 14 |
| 8. | Air mass conditions for January | 19 |
| 9. | Air mass conditions for July | 19 |
| 10. | Rainfall: May to October | 22 |
| 11. | Rainfall: November to April | 23 |
| 12. | Annual rainfall. | 25 |
| 13. | Climatic regions of Latin America | 27 |
| 14. | Natural vegetation of Latin America | 32 |
| 15. | Llanos country, Colombia | 33 |
| 16. | Badlands topography, Colombia | 36 |
| 17. | Andean terracing. | 38 |
| 18. | Thunderstorm erosion | 39 |
| 19. | Soil values in South America | 40 |
| 20. | Chief areas of soil erosion in South America | 40 |
| 21. | Distribution of races in Latin America | 44 |
| 22. | Distribution of population in Latin America | 51 |
| 23. | Church of San Marcello, Lima | 54 |
| 24. | Illiteracy in Latin America. | 57 |
| 25. | Primitive thatch huts in the tropical forest | 59 |
| 26. | An Andean Sierra village | 60 |
| 27. | Economic regions of South America | 72 |
| 28. | Working with a pre-Columbian plough | 73 |
| 29. | Distribution of minerals | 80 |
| 30. | Ecuador: political map | 112 |
| 31. | Bolivia: political map | 113 |
| 32. | Antarctica: political map | 116 |
| 33. | Latin America: major regions | 118 |
| 34. | Mayan ruins at Chichen Itza | 123 |
| 35. | Cross-section of Mexico | 126 |
| 36. | Mexico: general features | 131 |
| 37. | The silver-mining area of Pachuca, Mexico | 134 |
| 38. | Oil and natural gas in Mexico | 137 |
| 39. | Geographical regions of Mexico | 140 |
| 40. | Columbus Circle, Mexico City | 145 |
| 41. | Plan of Mexico City | 146 |

| <i>Fig.</i> | | <i>Page</i> |
|-------------|--|-------------|
| 42. | Fishing boats and butterfly nets, Lake Pátzcuaro, Mexico | 148 |
| 43. | Guatemala: general features | 156 |
| 44. | El Salvador: general features | 159 |
| 45. | Banana plantation | 162 |
| 46. | Honduras and Nicaragua: general features | 163 |
| 47. | Market in Nicaragua | 166 |
| 48. | Costa Rica and Panamá: general features | 168 |
| 49. | Map and cross-section of Panamá Canal | 171 |
| 50. | Miraflores Lock, Panamá Canal | 172 |
| 51. | British Honduras: general features | 175 |
| 52. | The West Indies | 180 |
| 53. | Cuba: general features | 183 |
| 54. | Hurricane damage | 187 |
| 55. | Haiti and the Dominican Republic: general features | 191 |
| 56. | Harvesting sugar-cane, the Dominican Republic | 192 |
| 57. | Jamaica: general features | 198 |
| 58. | The Leeward and Windward Islands | 204 |
| 59. | Trinidad: general features | 210 |
| 60. | Pitch Lake, Trinidad | 211 |
| 61. | Colombia: general features | 221 |
| 62. | Gold dredge, near Medellín, Colombia | 222 |
| 63. | Colombia: mineral resources | 223 |
| 64. | River boat on the Magdalena | 227 |
| 65. | Colombia: regions | 230 |
| 66. | Hauling logs, Colombia | 231 |
| 67. | A street in Bogotá | 232 |
| 68. | Venezuela: general features | 242 |
| 69. | Venezuela: oilfields | 244 |
| 70. | Oil derricks, Lake Maracaibo | 245 |
| 71. | The iron-ore deposits of El Pao and Cerro Bolívar | 246 |
| 72. | Venezuela: regions | 249 |
| 73. | Caracas: the city centre | 250 |
| 74. | The Guianas: general features | 257 |
| 75. | Bauxite mining in British Guiana | 260 |
| 76. | Ecuador: general features | 266 |
| 77. | Ecuador: regions | 271 |
| 78. | Peru: general features | 281 |
| 79. | Peru: regions | 287 |
| 80. | Cross-section of coastal Peru | 288 |
| 81. | Rubber worker in the selva | 295 |
| 82. | Oasis in the Peruvian Desert | 298 |
| 83. | Bolivia: cross-section west to east | 301 |
| 84. | Bolivia: general features | 306 |
| 85. | Bolivia: regions | 310 |
| 86. | The Altiplano, Bolivia | 311 |

| <i>Fig.</i> | | <i>Page</i> |
|-------------|---|-------------|
| 87. | Lake Titicaca | 312 |
| 88. | Bolivia: mining areas | 313 |
| 89. | A small property on the Altiplano | 315 |
| 90. | Brazil: administrative divisions | 322 |
| 91. | Brazil: economic features | 332 |
| 92. | Brazil: distribution of animals | 335 |
| 93. | Brazil: forests | 337 |
| 94. | Brazil: regions | 346 |
| 95. | The South-eastern Heartland | 349 |
| 96. | A coffee <i>fazenda</i> | 353 |
| 97. | Plan of a coffee <i>fazenda</i> | 354 |
| 98. | In the uplands of the state of Rio de Janeiro | 358 |
| 99. | View of Ouro Preto | 359 |
| 100. | View of Rio de Janeiro | 360 |
| 101. | Site of Rio de Janeiro | 361 |
| 102. | São Paulo city | 362 |
| 103. | Saveiros | 370 |
| 104. | Oil-refinery | 372 |
| 105. | The arid area of north-eastern Brazil | 376 |
| 106. | Carnauba palm | 379 |
| 107. | Palace of the Dawn, Brasília | 397 |
| 108. | The Amazonian selva | 403 |
| 109. | Amazonia: general features | 406 |
| 110. | Ile dc Mexiana, Pará | 407 |
| 111. | View of Manaus | 409 |
| 112. | Argentina: general features | 426 |
| 113. | Argentina: regions | 427 |
| 114. | The Humid Pampa: crops and animals | 429 |
| 115. | The railway network of the Pampas | 431 |
| 116. | The oases of Western Argentina | 434 |
| 117. | Patagonia: general features | 437 |
| 118. | Sheep in Patagonia | 439 |
| 119. | Lake and harbour Bariloche | 440 |
| 120. | Uruguay: general features | 443 |
| 121. | Gaicho driving stock, Uruguay | 445 |
| 122. | Paraguay: general position | 453 |
| 123. | Paraguay: general features | 456 |
| 124. | Plan of Vera Farm, Paraguay | 461 |
| 125. | Nitrate granulation plant | 469 |
| 126. | Chile: general features and regions | 474 |
| 127. | Chilean copper-mine, El Teniente | 476 |
| 128. | The nitrate deposits of northern Chile | 479 |
| 129. | The Chilean Heartland | 479 |

LIST OF TABLES

| <i>Table</i> | <i>Page</i> |
|---|-------------|
| I. Climatic statistics for selected stations | 21 |
| II. Growth of world population by continents | 48 |
| III. Countries of Latin America: population | 49 |
| IV. Population growth of selected cities | 62 |
| V. Percentages of world crop production. | 75 |
| VI. Iron ores: deposits and production | 77 |
| VII. Coal: reserves and production | 82 |
| VIII. Petroleum: reserves, production, and refineries | 84 |
| IX. Mexico: mineral wealth | 135 |
| X. Dominican Republic: sugar production | 192 |
| XI. Venezuela: oil production | 243 |
| XII. Brazil: crop production | 333 |
| XIII. Brazil: animal population | 333 |
| XIV. Uruguay: animal population | 445 |

PART ONE

THE GEOGRAPHICAL FRAMEWORK

Chapter I

THE PHYSICAL BACKGROUND

LOCATION AND CONFIGURATION

WHAT IS LATIN AMERICA?

The term "Latin America" has been given to a distinctive portion of the western hemisphere. It begins at the Río Grande, south of the United States, and stretches to the southernmost extremity of South America. It embraces Mexico, the countries of Central America, the West Indies, and the countries of South America.

The term denotes a cultural realm, a distinctive human theatre, not a specific continental area—since it embraces a wider area than South America—nor a single physiographical unit. It is a region of human, of cultural individuality. Both in its name and its ways of life Latin America reflects the importance of features of civilisation and culture traits inherited from the Latin countries of Europe, especially Spain and Portugal but also, though to a much less extent, France. Out of the twenty Latin American republics, eighteen have Spanish as the official or prevailing language; the two exceptions are Brazil, where Portuguese is spoken, and Haiti, where French is used. The Roman Church is the leading church throughout the region, and Roman Catholicism has tens of millions of adherents. This religion, which is a derivative from the Mediterranean world, is strongly entrenched in most countries and continues to exert a powerful influence.

Portuguese and Spanish manners, customs, institutions, and arts are still clearly discernible, especially outside the big cities (where "American" influences tend to overwhelm everything else). They are manifest in ecclesiastical and domestic architecture, the legal systems, in social etiquette, in the siesta habit, etc. The *hacienda* or large estate with its tied labourers was transplanted from Spain and Portugal and, though many of these estates are being broken up, as are their counterparts, the feudalistic *latifundia*, in Mediterranean Europe, many remain intact. Again, the Spanish tradition of centralised government has been kept alive and personal rule has been characteristic, even admired, in most Latin American countries. Democratic tradition has been lacking, though all the countries style themselves "republica." Finally, the cultural link with Latin Europe has been maintained through the immigrants, for the newcomers to Latin America have hailed predominantly from Italy, Spain, and Portugal.

Thus Latin America is a convenient term covering the geographical area, mainland and islands, lying south of the United States, in which

there is a basic substratum of Latin race, speech, and culture. It is this substratum which colours the area, gives it a distinctiveness and distinguishes it from other cultural realms such as Anglo-America, Black Africa, the Orient, etc. "Latin America is an entity," wrote Dr. Edward Sarmiento, "conscious of itself, bound together geographically as well as by a common past, racial and cultural affinity, and a sense of communal interests." *

DIVERSITY IN UNITY

Because, or partly because, Latin America forms a cultural entity in the broad sense, there is a tendency to think of Latin America as one unit; but this is a misconception. While superficially it may appear to form a single unit, fundamentally it does not. Diversity, rather than unity, is the keynote.

Latin America today consists of twenty countries geographically varying widely in size, shape, landforms, climate, and vegetation, inhabited by some 200 million people of very diverse racial make-up, living at different levels of economic, social, and cultural well-being. There is, for example, a great gulf between such backward and poverty-stricken states as Nicaragua and Paraguay and such socially advanced countries as Costa Rica and Uruguay.

Moreover, it should not be assumed that the introduction of Latin culture to Latin America took place without any modification. All culture traits and features suffer some, if only slight and subtle, transformation or transmutation when they are transplanted, and such changes have occurred in this case.

Furthermore, many present-day so-called Latin American culture traits are, in fact, of non-Latin origin, deriving from the native Indian peoples, from enslaved African Negroes, from imported East Indians and Orientals, and the cultural impact and impress of these different groups has varied widely from place to place.

Thus it becomes of vital importance not to generalise haphazardly and to be wary of allowing the term "Latin America," in spite of its usefulness, to mislead one into thinking that the individual countries are all very much the same, set in a common mould and displaying a uniform culture.

SIZE AND SHAPE

Latin America has a total land area of just under 8 million square miles; even so, it is still smaller than Anglo-America if Greenland be included and considerably smaller than Africa. South America accounts for approximately 7 million square miles, with the remaining territory, comprising Mexico, the Central American republics, and the West Indian islands, totalling under 1 million square miles.

The region as a whole does not form a single terrestrial block, and two quite distinct portions can be readily discerned—the continental mass of South America and the broken land area of Middle America. It is prefer-

* "Latin America," *Bureau of Current Affairs*, vol. V, 1950-51, No. 119.

able to use the term Middle America rather than Central America when the area in question includes Mexico, the Central American republics, and the West Indies. The term Central America can then be reserved for the countries of the isthmian region between Mexico and Colombia.

Mexico, itself roughly triangular in shape, forms the southern extremity of the North American continental triangle and continues the structural and topographical features of the cordilleran region. Central America and the Indies are part of a distinct structural unit. The peninsula of Yucatán and the island arc of the Indies separate two great embayments of the Atlantic Ocean, the Gulf of Mexico and the Caribbean Sea. This extensive water area between the main landmass areas of North and South America is sometimes called the "American Mediterranean." But any comparison between this sea and the Mediterranean can be made only on broad lines: the two are approximately the same size, and there is a distinct division of both seas into eastern and western basins; but the two water areas differ in many respects, in their latitudinal position, in the degree to which they are landlocked, and in their circulation.

In shape South America approximates to an irregular triangle. Superficially it is similar to North America: like the latter it has a high mountainous backbone in the west, highlands in the east, and a lowland in the centre. It is the disposition of the highland masses within the continent that shapes South America's triangular form. Of all the continents, Africa excepted, South America is the one possessing the least indented coastline, and consequently the shortest length of coast in relation to its area.

South America, and Latin America more so, forms a major unit of the earth's surface from the point of view of its physical dimensions. Physical size, which is merely a matter of statistics, is of relatively little importance, however; what does matter is the habitability of the area and its economic usefulness. In this respect, Latin America is less fortunate than Anglo-America but more fortunate than Africa. Shape, again, though it may be significant, is probably less important than accessibility. However irregular or awkward the configuration may be, it matters little so long as the various parts are accessible. In this respect Latin America is, again, superior to Africa.

GEOGRAPHICAL POSITION

Geographical position implies two things: absolute location and relative situation. Absolute location is position in terms of latitude and longitude; it is a mathematical reckoning, fixed and unalterable. Relative situation is the position of an area with respect to other areas, either land or water areas, and especially its accessibility, which is a variable factor.

The position of Latin America shows some interesting and notable features. It extends through over 85 degrees of latitude—from 33 degrees N. to 56 degrees S.—or nearly 6000 miles, and so has an extent greater than that of any other major world region. Moreover, its longitudinal extent is considerable: the most westerly point is about 115 degrees W. and the

most easterly about 35 degrees W. Not all of the area within these mathematical lines of reference is, of course, land. In a rough way the region lies balanced across the equator but with the greater proportion in the southern hemisphere. Middle America, except for most of the Indies, lies, it should be noted, to the west of South America. Moreover, Latin America's position astride the equator means that the bulk of the region—over 80%—lies between the tropics and, accordingly, the climates of the region are predominantly tropical or sub-tropical in type.

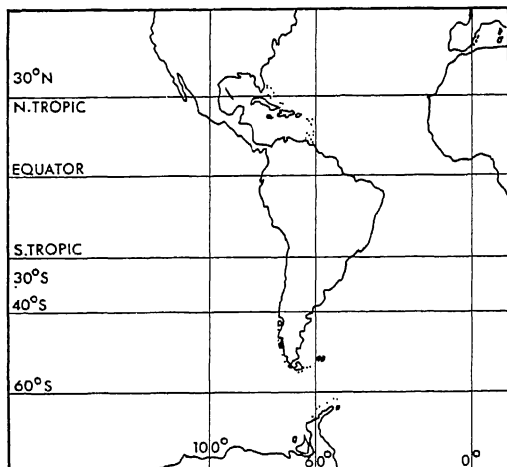


FIG. 2.—Geographical position of Latin America.

It is worth considering South America's position as compared with that of North America. South America lies much farther east than its northern neighbour: indeed, the bulk of the continent lies east of North America. This is clearly seen by glancing at the map and tracing the meridian 75 degrees W. Almost the whole of South America lies east of this line of longitude whereas nearly all of North America falls to the west. The meridian of 81 degrees W., which marks the western limit of South America, passes through the middle of Lake Erie and Florida, while the meridian 35 degrees W., which approximately delimits the southern continent's most eastern extension, lies about 20 degrees farther east than Newfoundland.

SPATIAL RELATIONSHIPS

South America's easterly position brings it some distinct advantages. In the first place, the African coast at its nearest point (Freetown) lies only 1550 miles east of Cape São Roque (Brazil); and in the second place it brings the east coast of the continent almost as near to western Europe as is the east coast of North America. It is this proximity to the Mediterranean lands plus, historically, the assistance given by the Atlantic Islands

(Canaries, Azores) and the Trade Winds, which helps largely to explain the predominating Latin influence in Latin America. A disadvantage which South America suffers as a result of its more easterly position is its greater distance, as compared with North America, from eastern Asia and Australia.

The location of Middle America between the main continental land areas of North and South America invests this hinge region, with its land and water links, with considerable political, strategic, and economic importance. Politically Middle America forms part of the Latin American political region and part of the even wider Western Hemisphere Defence Area. As the link between the two American continents, and especially since it contains the Panamá Canal, a major inter-ocean connection, the region possesses great strategic importance, particularly to the United States. Another aspect of its importance is its communications with the United States and its connections with the world at large provided by the important shipping routes converging on the region, many of them, of course, attracted by the inter-ocean link of the Panamá Canal.

Appreciation of distance is important in the geography of Latin America. Realisation of the great distances involved can perhaps best be achieved by giving a few figures and comparative distances. It has already been pointed out that the distance between the Mexican-United States border and the southern tip of South America is nearly 6000 miles; this is roughly equivalent to the distance between Edinburgh and Cape Town or London and Peking. The islands forming the former British West Indies are spread over a distance of more than 2000 miles, equivalent to the distance between London and Constantinople, and this has been a strong factor militating against unity. Chile, the "shoe-lace" of South America, is 3000 miles in length—approximately the same distance as London to Baghdad. The distance from Mexico City to Bogotá in Colombia is 2000 miles; from Bogotá to Río de Janeiro, 3000 miles; from Río to Buenos Aires 1500 miles; and from Buenos Aires to Cape Horn 2000 miles. It is clear that distances in Latin America are impressive in their magnitude. Formerly sheer distance created an acute communications problem, but with the coming of air travel the problem of distance in the region as a whole has been transformed during the past two generations and, indeed, there are few peoples so air-minded as the Latin Americans.

STRUCTURE AND RELIEF

Middle and South America, though linked together physically, are structurally separate. In Mexico the structure and relief is, at least as far south as 20 degrees N., a prolongation of North America. The Indies together with the isthmian part of Central America belong to a separate structural region of folded and faulted rocks which has a roughly east-west alignment. Although Central America acts as a kind of hinge linking the

northern and southern American continents, its structural relations with the adjacent land masses on either side are somewhat incidental. South America, which also forms a distinct structural entity, is attached physically to Central America by the narrow isthmus of Panamá, which is "much more a barrier between oceans than a link between continents." In describing the structure and surface features it will be convenient to treat Middle and South America separately.

MIDDLE AMERICA

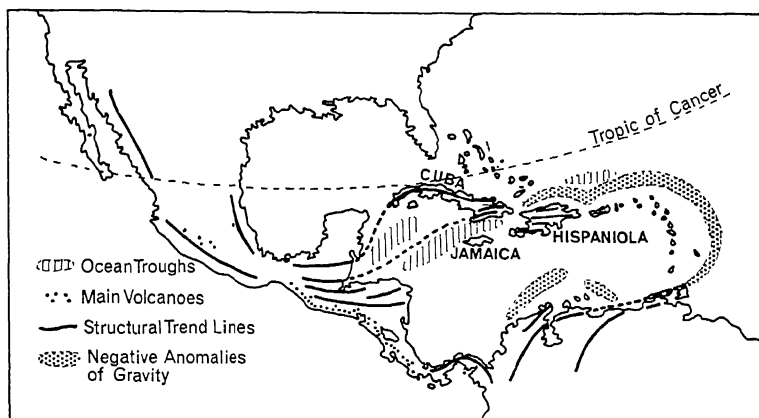
Middle America here is taken to include not only the continental mainland but the West Indies as well. On the mainland two major divisions can be recognised, the northern section from the United States frontier to the Isthmus of Tehuantepec, comprising most of Mexico, and the southern section lying between the Isthmuses of Tehuantepec and Panamá.

The North American continent beyond the Mexican border begins to taper southwards. The structural features of the cordilleran system are continued in Mexico, finally petering out in the Isthmus of Tehuantepec. Mexico to the north of this isthmus can be described simply as an intermontane plateau bounded on the west by the range of the Sierra Madre Occidental and on the east by the Sierra Madre Oriental. In detail the Mexican Plateau, which lies between approximately 4000 and 8000 ft above sea-level, consists of a number of basins and depressions separated by low ridges of hills. Here and there more lofty mountains occur which are of volcanic origin. Running approximately parallel to the mainland of north-western Mexico is the rough and rocky Californian Peninsula; the peninsula is separated from the mainland by the long depression which forms the Gulf of California.

Between the Isthmuses of Tehuantepec and Panamá the "hinge" exhibits a highly irregular configuration. Two structural trend lines are apparent. From southern Mexico to the Nicaraguan lowlands the structural trend is east and west. The mountainous backbone in this section is rather irregular and on the west forms a high plateau smothered by volcanic ash and lava. Eastwards the mountains plunge beneath the sea, reappearing in the Greater Antilles. With the exception of the low limestone plain of Yucatán, the whole area is a tangled complex of volcanic peaks, high plateau, basins, and valleys; coastal lowlands are very restricted. In southern Nicaragua a large lake occupies a central depression amidst the mountains.

The narrow isthmian section which lies between southern Nicaragua and Colombia is made up of a series of fold mountains with a general north-west—south-east trend. It is a region of high ranges, well over 5000 ft in most places; the terrain is very rough, and lowlands are strictly limited in size. The structural and relief features of the entire isthmian region are much more complicated than in Mexico and the common textbook division into a Caribbean slope, a central plateau belt, and a Pacific

slope must be thought of as very rough. Although coastal lowlands scarcely appear to manifest themselves, at least on the usual atlas map, small marginal plains are found along either coast, although those on the Pacific side are much less extensive than those fronting the Gulf of Mexico and the Caribbean Sea.



[After A. Holmes.]

FIG. 3.—Structure of Middle America

Throughout the isthmian region there are a number of transverse depressions, occupied and partially formed by streams, which provide natural through-ways across the spinal uplands from the Pacific to the Gulf of Mexico and the Caribbean Sea. Four main routes are worthy of mention: (1) the low divide across the Isthmus of Tehuantepec, crossed by a railway; (2) the way from the Gulf of Honduras via the Motagua river to San José, also followed by a railway; (3) the Lake Nicaragua depression, which nearly touches the west coast and is drained eastwards by the San Juan river, affording the possibilities of a trans-isthmian water route; and (4), the Panamá Canal, which uses the natural lowlands (and the artificial Gatún Lake) to effect a crossing.

The islands of Central America fall naturally into three groups, viz. (1) the Bahamas, (2) the Greater Antilles, and (3) the Lesser Antilles.

The Bahamas archipelago is mainly composed of coral reefs and morphologically is distinct from the Indies. The Greater Antilles continue the east-west structures which we have already noted in the northern section of the isthmian region. These islands are either the upstanding portions of a submerged mountain chain or "the first visible symptoms of an embryonic mountain chain."* Vening Meinesz found as a result of submarine gravity surveying that around the north of the island of Hispaniola, the Lesser Antilles, and the northern coast of South America, there was a band of negative anomalies of gravity, evidence which strongly suggests

* HOLMES, A. *Principles of Physical Geology*. London. 1944. P. 27.

that orogenic, or mountain-building, processes are in operation. The structural trend, indicated by the interrupted single mountain range, can be traced from the Virgin Islands, through Puerto Rico, to the Cordillera de Cibao of the Dominican Republic.

West of the Cordillera, which forms a mountain knot, the range bifurcates, one fork giving rise to the northern peninsula of Haiti, the Sierra Maestra of Cuba, and the Cayman Islands, the other marking the southern prong of Haiti and the mountains of Jamaica. The Lesser Antilles form an arc of volcanoes, which continues the line of the Tertiary folds and appears to link up with a branch of the Andes. The islands of Trinidad, Tobago, and Barbados do not seem to be connected structurally with the main Lesser Antillean arc; on the other hand, they are more definitely connected with the mountains of northern Venezuela and hence with the Andes. The islands of the Lesser Antilles are mainly volcanic, though there is an outer arc of coral islands. The volcanic islands exhibit all stages of growth and decline: some consist of active volcanoes and are still growing; others have ceased activity and are in the process of being dissected; yet others are old worn-down stumps.

Topographically, the islands of the West Indies show considerable variety: some are mountainous and very rugged such as Jamaica and Hispaniola; some are volcanic with steeply sloping sides such as Montserrat and St. Christopher; some are denuded plateaus or plains as, for example, Antigua and Barbados; while others are low-lying coral islands like the Bahamas. Variety of surface form and landscape is an outstanding feature of the West Indian islands.

SOUTH AMERICA

From the structural point of view, South America is composed of two principal units: (1) the Guiana-Brazilian plateau or "shield," and (2) the Andes, forming a cordillera of young fold mountains.

The ancient shield, which underlies most of Brazil and parts of the adjacent countries and stretches beneath the present-day central plains to the base of the Andes, may be visualised as the original nucleus around which the rest of the continent has grown. This continental core is made up of crystalline basal rocks with superior layers of sandstones and shales. Throughout its prolonged geological history it has suffered many tectonic movements, being elevated, depressed, tilted, and fractured. But always it has withstood folding, and since its planation in Pre-Cambrian times it has remained and behaved as a fairly stable block. This massive, resistant shield area is reminiscent of the African Plateau and the Plateau of Western Australia, to which, in truth, it may well be related, having perhaps formed part of that great southern continent, Gondwanaland, which, it is postulated, may have existed long, long geological ages ago.

The Cordilleran ranges are built of folded rocks which were originally laid down in a great geosyncline which extended along the western and northern flanks of the shield. These sedimentary accumulations were dis-

turbed from time to time and suffered folding. The vertical uplift which resulted in the erection of the Andes as we now know them appears to have occurred in post-Miocene times and happened in a series of jerks. As a result of this uplift volcanic activity was induced, the vulcanism continuing to the present time. From end to end of the young folded mountain system volcanoes have been thrown up. Faulting has also occurred in

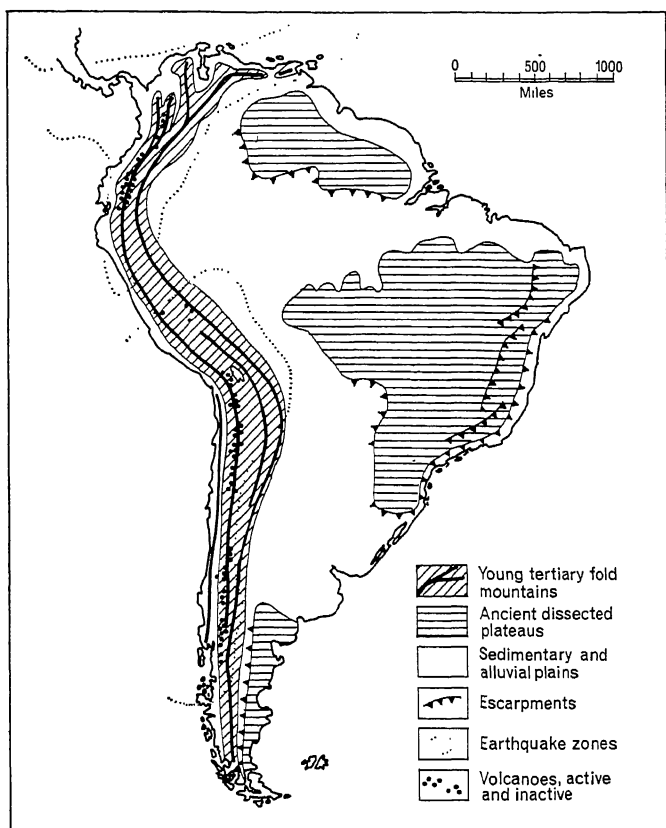


FIG. 4.—Structure of South America.

accompaniment with the uplift, producing extensive trough faulting on the Pacific coast and accounting for the step-like topography in parts of Ecuador and Peru and the long, straight, parallel valleys of the Rivers Cauca and Magdalena. Evidence of the instability of the region is provided by destructive earthquakes which happen from time to time, such as the disastrous quake which struck southern Chile in 1960. The presence of raised beaches along the Pacific coast is indicative of the recent uplift of the Andes. The forces which raised the mountains are still at work, though their activity is much subdued.

Topographically South America consists of three well-marked belts,

the Western Cordillera, the Interior Plains, and the Eastern Plateaux. Seven main physical regions may be distinguished: (1) the Andes, (2) the Orinoco Lowlands, (3) the Guiana Highlands, (4) the Amazon Lowlands, (5) the Brazilian Plateau, (6) the Pavaná-Paraguay Lowlands, and (7) the Patagonian Plateau.

The mountain range of the Andes is the most striking feature of South America. It extends for over 4000 miles without a break along the entire western side of the continent and achieves a maximum width of nearly 300 miles in its mid-section. The Andes culminate in Mt. Aconcagua, which reaches 22,829 ft above sea-level. Like other Tertiary young fold mountains in other parts of the world, the ranges of the Andes display a looping and knotting pattern and embrace high intermontane plateaux. In southern and central Chile the Andes form a single narrow dominant ridge. North of latitude 28 degrees S. the Andes splay out into two major ranges enclosing the high plateau of Bolivia and Peru. The ranges converge again at the Vilcanota Knot. From the latter the Andes diverge again, this time into three ranges, to focus once more, on the Pasco Knot. From thence another three ranges splay out to converge at the Loja Knot. From the Loja Knot two ranges branch out which enclose the Ecuadorean Plateau before they come together again at the Pasto Knot. In the Northern Andes three distinct ridges with deep intervening valleys run north-eastwards from the Pasto Knot through Colombia and into Venezuela.

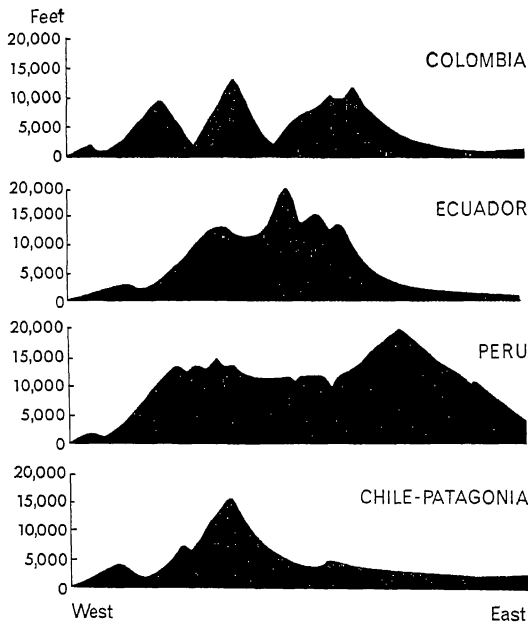


FIG. 5.—Cross-sections of Andes. These profiles, approximately drawn and not to scale, indicate the varying width and character of the Andes in different latitudes.

The Cordilleran system forms a great physical and climatic barrier and acts also as a formidable obstacle to human communications. The mountains rise steeply, sometimes precipitously, from the Pacific, soaring often to a height of 3 miles and exhibiting snow-capped peaks. Within the ridges, however, lie the high plateaus with their fairly level, monotonous surfaces. A narrow coastal lowland, more particularly developed north of 18 degrees S., fronts the Pacific. The eastern flanks of the Andes are deeply cut by steep-walled valleys, but descend to the interior lowlands with, usually, gentler slopes.

The Eastern Highlands occur as three separate masses: in the middle is the extensive Brazilian Plateau, to the north the Guiana Highlands, and to the south the Plateau of Patagonia. The Brazilian Plateau is a vast triangular-shaped massif which has been tilted up in the south-east. The fractured edge of the plateau is well marked in the south-east, since it forms a high abrupt escarpment. The plateau slopes north-westwards towards the Amazon basin. The general level of the plateau is under 5000 ft, and towards the Amazon there are vast areas under 1500 ft. Although

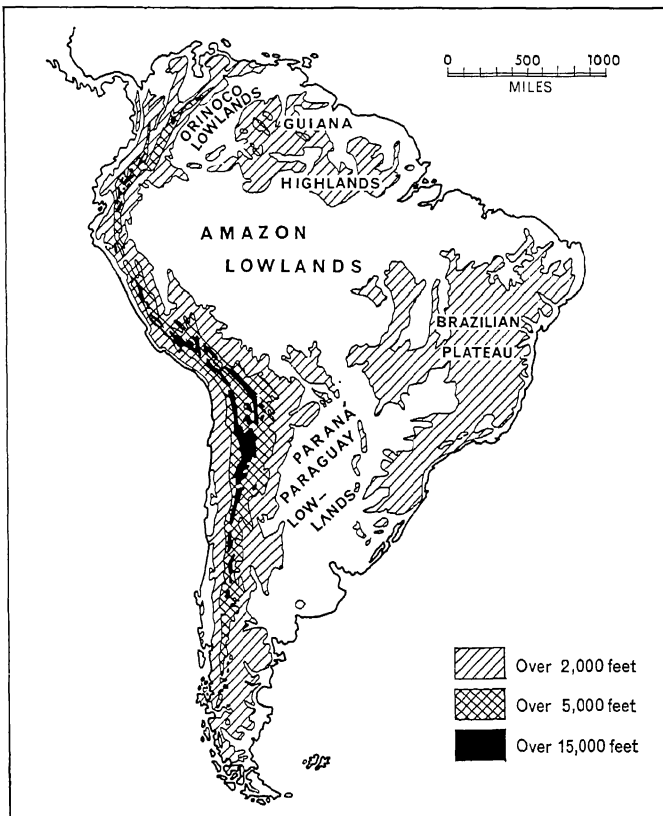


FIG. 6.—Relief of South America.

a dissected plateau, there are many level areas, particularly in the centre and north. Irregular ridges project above the general surface level. A narrow coastal lowland, extending from Cape São Roque as far as Río de Janeiro, bounds the eastern edge of the plateau.

The Guiana Highlands, which are really a detached fragment of the old shield, are about 3000 ft high in the western section and around 1000 ft in the east; the highest point, Mt. Roraima, is 8620 ft above sea-level. The scarp slope of the Guiana Highlands overlooks the Amazon basin; the more gentle slope is northwards. The Patagonian Plateau in the southern extremity of the continent lies between 1000 and 3000 ft. Horizontal sedimentary strata overlie a crystalline base. In places lava sheets occur. Accumulations of shingle and glacial debris are also found. The surface of the plateau is very irregular and its bare, windswept character does not present a very inviting aspect. An interesting feature is the pre-cordilleran trough which runs along the western edge of the plateau from the Río Negro to the Straits of Magellan. This sub-andine depression results from the plateau stopping short some 20 miles from the Andes and presenting a scarp edge to the mountains.*

Lying between the Andes and the eastern plateaus are three great lowland areas occupied by South America's three major river systems, the Orinoco, Amazon, and Río de la Plata. These three river plains make up nearly half the total area of the continent and account, moreover, for by far the greater proportion of all the South American lowlands. The Orinoco Plain, usually called the *Llanos*—a term which means "plain"—is an alluvial basin between the Northern Andes and the Guiana Highlands. Southwards lies the vast lowland of the Amazon covering over 2 million square miles. From the Atlantic to the Andes the plain extends more than 2000 miles; in width it varies from about 800 miles in its western portion to less than 400 in its eastern. As in the case of the Orinoco, sedimentary rocks of Tertiary age are covered by recent alluvium which floors the basin.

The gradient of the Amazon is very gradual: the last 500 miles of its course fall less than $\frac{1}{2}$ in. per mile, while at a distance of 2000 miles from the sea the river is less than 50 ft above sea-level. Though so low lying, the plain is by no means entirely flat. As a region the Amazon Basin is unique and forms one of the most homogeneous physiographic units in the continent. Just as the Orinoco Plain is connected along its southern margin with the basin of the Amazon, so the Southern Plains are linked to the vast central lowland. The lowlands of eastern Bolivia, lying between the Andes and the Brazilian Plateau, form a corridor connecting the Amazon Plains with the Southern Plains. The Southern Plains, though forming a single physiographic unit, may be said to comprise two parts: the Paraná-Paraguay Plains, a low alluvial plain which slopes gently southwards to the Plate estuary, and the Pampa Plain of Argentina, which slopes gently eastwards and is built up of alluvial, aeolian, and volcanic deposits.

* SHANAHAN, E. W. *South America*, 9th edition. Methuen. 1953. Pp. 217-18.

Coastal plains are few and of restricted size, except where the major rivers have built up deltas. Along the Pacific coast where the Andes rise up steeply the belt of lowland adjoining the sea is very narrow and frequently does not exist. Along the eastern coast both the Brazilian and Patagonian Plateaus usually rise fairly sharply and give but a limited coastal plain. Between the Guiana Highlands and the sea, rivers have built up an alluvial plain, but nowhere is this more than 50 miles wide. The dearth of marginal lowlands is an unfortunate feature of South America's physiography, but in this respect the continent is no worse off than the other land masses of the southern hemisphere.

RIVERS AND DRAINAGE

In both Middle and South America, just as in North America, the main hydrographic divide between Atlantic and Pacific drainage is provided by the high young fold mountains in the west. In South America the continental watershed lies near the crest of the Andes. All the important rivers in the entire Latin American region drain towards the Atlantic. Broadly speaking, the rivers flowing eastwards are long rivers with perennial flow, while the westward-flowing streams are short, swift, and very often distinctly seasonal in their regime.

THE RIVER SYSTEMS

Ignoring the Río Grande, which forms the frontier between Mexico and the United States, five major river systems share the greater part of the drainage of the region. All of them, moreover, are found in South America; they are: the Cauca-Magdalena, the Orinoco, the Amazon, the São Francisco, and the Paraná-La Plata river systems. While the Cauca-Magdalena drains the northern ranges of the Andes and the São Francisco drains the eastern part of the Brazilian Plateau, the other three drain the three main divisions of the central plains.

The Magdalena, which rises on the eastern slopes of the Andes in southern Colombia, flows northwards for over 1000 miles into the Caribbean Sea. The Río Cauca, itself over 600 miles long, is the Magdalena's chief tributary. The Orinoco, about 1500 miles in length, drains the extensive lowlands between the northern Andes and the Guiana Highlands and empties itself into the Atlantic through a wide delta. The river and its tributaries become greatly swollen as a result of summer rains and cause much of the low-lying plain to be flooded. An interesting feature of the Orinoco is that in southern Venezuela it connects through the Casiquiare with the Río Negro, one of the Amazon's great left-bank tributaries.

The Amazon, or Río Amazonas as the Brazilians call it, is the world's greatest river and well deserves its name "King of Waters." The length of the main stream of the Amazon, including the Marañón, which is usually considered to be the Amazon proper, is just over 3000 miles. The river is fed by more than a dozen great tributaries, each several hundred

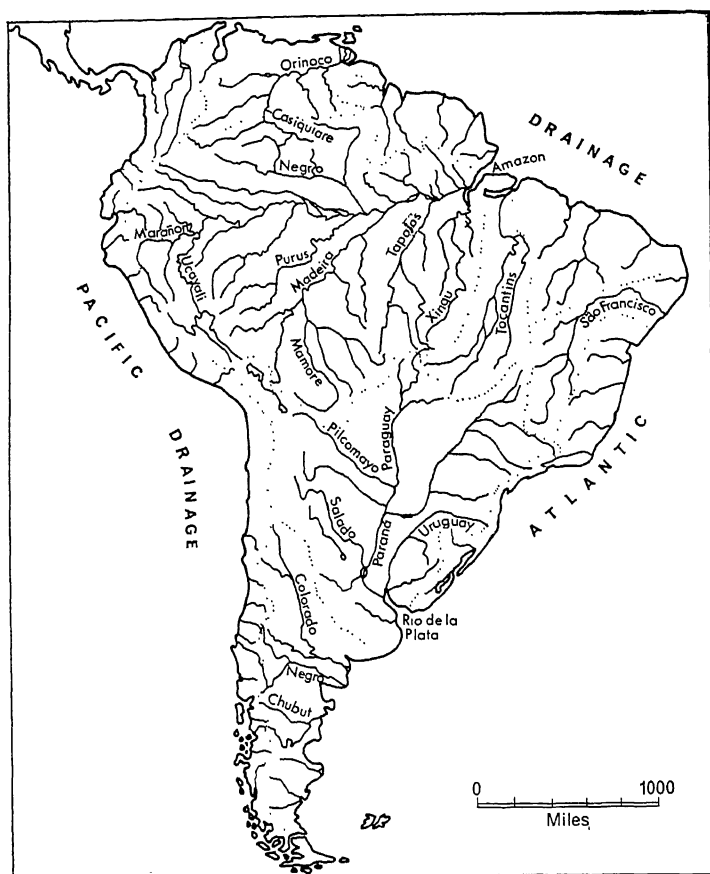


FIG. 7.—Drainage systems.

miles long. The Amazon's vast basin covers an area of about 2,722,000 square miles. The river's high-water floods, which occur in June, result in the inundation of wide areas of the low-lying alluvial plains. The volume of water brought down by the river is so great that fresh water is to be found in the ocean some 200 miles from the mouth of the Amazon. A notable feature, characteristic of the low-water period, is the bore, a tidal phenomenon, which reaches far upstream and attains on occasions a height of 16 ft.

The São Francisco, which drains the eastern portion of the Brazilian Highlands, is about 1800 miles long. It flows parallel with the Brazilian coast for the greater part of its course before making a right-angled bend and debouching into the Atlantic some 400 miles south of Cape de São Roque. The Paraná-La Plata system, which drains northern Argentina, Uruguay, Paraguay, and portions of Bolivia and Brazil, comprises two main rivers, the Paraná, itself augmented by several great tributaries, *e.g.* the Paraguay, Pilcomayo, Vermejo, and Salado rivers, and the Río Uru-

guay. The Río de la Plata, strictly speaking, is the 225-mile-long estuary of the Paraná and Uruguay rivers. Between the river outlets of the Paraná and Uruguay is an extensive delta.

Outside these great systems, the rivers elsewhere in Latin America, with the exception of two areas, are short streams. The exceptions are provided by the rivers that flow from the Central Plateau of Mexico to the Pacific, *e.g.* the Río Grandé de Santiago and the Río Balsas or Mexcala, and the series of parallel rivers running across the Patagonian Plateau to the southern Atlantic, *e.g.* the rivers Colorado, Negro, Chubut, Deseado, etc. Elsewhere, however—on the eastern scarp slopes of the Brazilian Highlands, in the Guianas, on the steep Pacific slopes of the Andes, and on the western slopes of the Western Sierra Madre—streams are typically short and swift-flowing, and not infrequently dry up or become reduced to the merest trickle at certain times of the year. For example, the streams which drain the Pacific edge of the Mexican Plateau are deeply entrenched as a result of the torrential rains which occur during the summer season, but they are also liable to seasonal fluctuations, and only the larger manage to maintain a perennial flow.

Interior drainage is characteristic of certain areas where intermontane basins and depressions occur, notably on the plateau of Mexico, the Andean plateaus, and in north-western Argentina. In these areas mountain streams terminate in shallow depressions, generally known as *bolsons*, sometimes producing a lake, such as Titicaca in Bolivia-Peru, sometimes a saline marsh, such as the Salinas Grandes in Argentina.

DRAINAGE PATTERNS AND FEATURES

A feature of the drainage, which is especially well marked in South America, is that a large proportion of the rivers flow initially towards the interior of the continent. This is an outcome of the peripheral disposition of the highlands. The various streams flowing down the eastern slopes of the Andes and the inward-facing slopes of the Guiana and Brazilian massifs sooner or later unite to form the three principal river systems of the interior plains. A corollary of the inward drainage is the "flagon-shaped" basins, as Shanahan* aptly describes them, which reach the coast through relatively narrow bottlenecks.

Due in part to the concentration of the drainage interiorwards and in part to the heavy rains which occur, extensive areas in South America are either almost always water-logged or suffer seasonal flooding. The Amazon, for example, regularly overflows its banks, filling dried-up former channels, marshy backwater areas, depressions, etc., and spreads out to form wide areas of swamp and lagoon known as *campos de varzea*. Similar flooding occurs on the plains lying between the western edge of the Brazilian Plateau and the Río Paraguay, giving rise to what is known as the *Pantanal*. Vast areas become super-saturated and the land becomes covered with a sheet of slowly moving water every rainy season. Again, in the

* *South America*. P. 5.

Orinoco basin widespread flooding follows the rains. The northern lowlands of Colombia are "a tissue of swamps and lagoons," with the plains to the east of the Magdalena lying under water for much of the year.

The three great river systems of South America—Orinoco, Amazon, Paraná-La Plata—are, at least in their present form—relatively young rivers. There is some evidence to suggest that a former great river, roughly following the present axial line of the Amazon drainage system, flowed westwards, but in early Tertiary times subsidence and marine invasion of Amazonia occurred. The uplift of the Andes resulted in the re-orientation of the drainage. The São Francisco, Tocantins, Xingú, and Tapajóz are in all probability very old rivers, since the Brazilian Plateau is an ancient block which has remained fairly stable through prolonged periods of geological time. "The rivers of the plateau have accordingly had a long time in which to excavate their valleys," writes Shanahan.* "The river valleys are thus well developed; they are as a rule deeply cut into the hard rocks of the plateau and are comparatively broad; the river beds are so graded that the water descends from the plateau rather by a series of cataracts than by great waterfalls; tributaries tend to enter the main streams by valleys whose lower parts are worn down to the same levels as those of the receiving streams; and the whole inland drainage is concentrated in a small number of powerful rivers."

Two drainage features of interest occur in north-eastern Brazil. The first relates to the São Francisco and the great right-angled bend in its lower course. This bend appears "unnatural" and suggests an interference with the original drainage line. In all likelihood this bend represents a case of river capture. The São Francisco probably flowed originally north-eastwards but had its lower course tapped and its waters diverted by an escarpment stream cutting backwards into the plateau. Evidence supporting this hypothesis is provided by the south-west—north-east depression which can be discerned running beyond the bend and continuing the direction of the São Francisco and by the falls in the river's lower course which are not characteristic of a mature stream. The second feature is the superimposed drainage pattern. Originally sedimentary capping rocks, chiefly sandstones, covered the crystalline basement rocks and the rivers were initially developed on these overlying sedimentaries. The thick sandstone layers were ultimately denuded away, but the influence which this original rock cover exerted upon the drainage pattern continues to predominate over that of the more recently exposed bedrock; in other words the rivers have become superimposed on the underlying crystalline rocks.

RIVERS: THEIR USES

Most of the great rivers are navigable. Because of limited alternative means of communication, some of the major rivers, particularly the Amazon, play a very important role in transportation. The Amazon system

* *South America*. Pp. 110-11.

alone offers nearly 20,000 miles of navigable waterway, a mileage which is increased to about 36,000 in time of flood. Unfortunately the river is little used as a result of the very restricted economic production in the basin. The Paraná-La Plata, in contrast, carries a considerable volume of traffic and river steamers can ply as far as Asunción, the capital of Paraguay. On the Magdalena, Orinoco, and São Francisco through navigation is interrupted by falls or rapids, although each of these rivers possesses five hundred or more miles of navigable waterway. The rivers flowing to the Pacific are nearly all short and usually unnavigable.

Many of the rivers are of great value as sources of water power and water for irrigation purposes. In Middle America the hydro-electric power potential is not large since considerable areas, especially in northern Mexico, are arid or semi-arid. Many possible power sites in Middle America need costly dams to realise the hydro-electric possibilities. Rivers here, and especially in Mexico, where petroleum and natural gas offer alternative sources of power, are probably of more use as providers of irrigation water. Even so, river development schemes nowadays are commonly multi-purpose projects. In certain areas of South America, notably the Andes and the plateau edges, the water-power potential is great. Unfortunately the areas providing the richest possibilities are often somewhat inaccessible and far removed from present centres of population. It is worth emphasising that the Amazon, in spite of its great size and tremendous volume, is, except in its Andean upper reaches, of very slight value from the point of view of power possibilities. Along much of the Pacific coast dry conditions obtain, and the mountain streams bring life-giving water to these parched littoral lands. These streams, however, are often of restricted volume and seasonal in their regime. Hydro-electric power possibilities are limited because of the small and irregular flow of the rivers. Potentials are greatest in southern Chile, where the Andean streams have abundant all-the-year-round flow.

Rivers, in addition to their importance for trade and transport and hydro-electric power, are sometimes of politico-geographical significance. Rivers (and lakes too) often serve as state boundaries and occasionally have given rise to inter-state disputes over water use and water rights.

WEATHER AND CLIMATE

The weather conditions and climatic regime of any area are the result of the interplay of several conditions or physical factors, chief of which are: (1) latitudinal position on the earth's surface, which very largely decides conditions of temperature; (2) size of the area and its relation to neighbouring land masses and water bodies, which affect both temperature and humidity; (3) atmospheric conditions, which determine the pressure, air masses, winds, and storms; and (4) surface relief, notably altitude, and the configuration of the coast and their relations with prevailing air streams.

In Latin America climatic conditions and the climatic pattern are the

outcome especially of two physical conditions—latitude and elevation: the former accounting for the widespread tropical climates and the restricted areas of temperate climates; the latter for the high proportion of temperate and even cold conditions within tropical latitudes. In no part of the world are there such wide differences of climatic conditions within such short distances as occur in Latin America; this climatic variation within narrow limits is one of the outstanding characteristics of the Latin American region.

TEMPERATURE CONDITIONS

Latin America extends from approximately 33 degrees N. to 56 degrees S., but about three-quarters of the total area lies within the tropical zone. The greatest breadth lies in the tropical zone, where the mean annual range is small, a feature that is typical of all inter-tropical areas the world over. In the extra-tropical parts the northern portion broadens, in Mexico, and as the Sierras cut the plateau surface off from marine influences and as the area is subject to continental influences from North America, there is a more pronounced range of temperature seasonally; the southern portion, *i.e.* temperate South America, tapers southwards so that the surrounding seas exert a tempering effect over most of the area. The area experiencing an annual range of over 20° F lies east of the Andes; indeed, but for the Andean barrier, which prevents Pacific influences from reaching Argentina, this already relatively moderate temperature range would be further reduced.

In July when the sun is shining vertically over areas near the northern Tropic the area north of the Amazon is experiencing the summer season while south of that river it is the winter season. At this time the highest temperatures occur over the Mexican Plateau, where the mean July temperature is over 90° F (32° C). Almost the whole of Latin America north of the equator has mean temperatures of over 80° F (27° C) during this month. South of the equator the isotherms run roughly from east to west, except along the Pacific coast, where, as a result of the northward-flowing cold Humboldt Current, they bend towards the north.

When the sun is over the Tropic of Capricorn South America south of the equator is experiencing the summer season. At this time of the year the area of greatest heat lies over the southern part of the Amazon lowlands and the interior portion of the Brazilian Plateau: the mean January temperature is over 80° F (27° C). Isotherms tend to bend southwards over the land in convex fashion. West of the Andes the isotherms trend from north-west to south-east due to the cold current along the Pacific coast. In Central America the isotherms run roughly east to west; moreover, in January virtually no part of the region lies outside the mean temperature isotherm of 60° F (16° C).

There are certain features of the temperature conditions that deserve attention. These features may be enumerated as follows: (1) the prevailing equability over most of Latin America; (2) almost the whole of the inter-

tropical belt has temperatures of above 70° F (21° C) throughout the year; (3) the cold Humboldt Current causes a distinct bending equatorwards of the isotherms at all seasons; (4) the highest temperatures are to be found not in equatorial latitudes but in areas to the north and south of them; (5) the high average temperatures throughout the year in the vast area of Amazonia.

AIR MASSES, PRESSURES, AND WINDS

Atmospheric conditions, which control air mass movements, storms, and winds, are largely determined in July by four pressure systems, viz. the North Atlantic High, the South Atlantic High, the South Pacific High, and the Equatorial Low. Weather conditions and the resultant climates are mainly the outcome of the interplay of these systems of pressure. In January these same four permanent pressure "cells," in slightly changed positions and slightly altered in their strengths, continue to dominate the picture, although a further system—the North American High—influences Mexico and the Caribbean area (see Figs. 8 and 9).

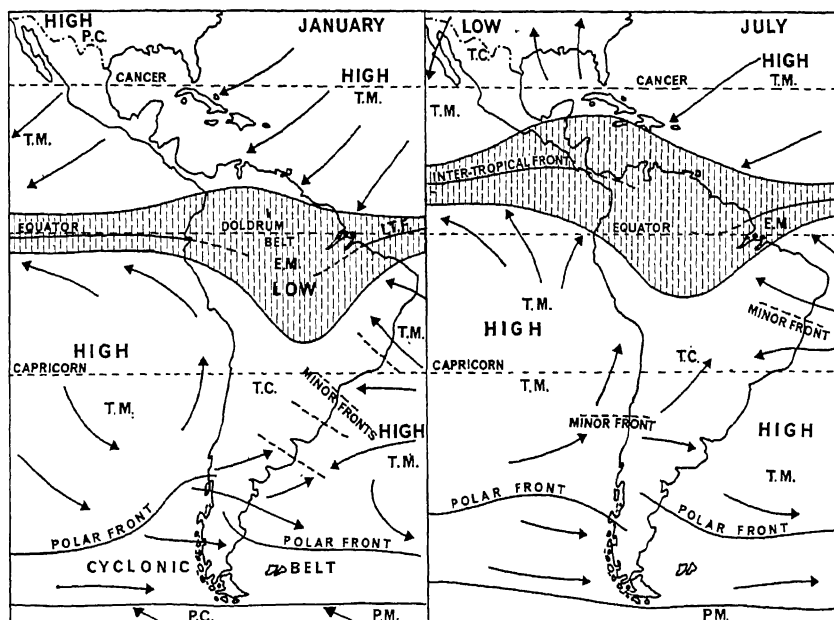


FIG. 8.—Air mass conditions for January.

Pc = Polar continental
Pm = Polar maritime air
Tc = Tropical continental air

FIG. 9.—Air mass conditions for July.

Tm = Tropical maritime air
Em = Equatorial maritime air

In July equatorial air masses prevail over most of Central America and the northern part of South America and the air is warm, very humid, and potentially unstable, since it is colder than the underlying land surface.

When this air comes into contact with the warmer land surface instability develops. Hence the areas dominated by equatorial air masses are characterised by piles of cumulus cloud and thunderstorms. The variations in the direction and strength of tropical air streams, as well as the nature of the air, are dependent upon the pressure systems. The air moving eastwards and northwards from the South Pacific High (*i.e.* Tropical maritime air) is cool, dry, and stable, since it derives from an area of subsiding air. This air in its movement towards the continent passes over the abnormally cool water of the Humboldt Current, hence its air mass characteristics of coolness, dryness, and stability are accentuated further. As a result the coastal area of northern Chile and Peru is desert.

The Tm air issuing from the equatorial and western side of the South Atlantic High is warm, humid, and unstable and likewise reinforced by its passage over the warm ocean currents. South of the Tropical air masses are the Polar air masses of the southern Pacific and the southern Atlantic. These air masses are potentially unstable, and as the Polar maritime air of the Pacific moves eastwards and is forced to ascend over the mountains of southern Chile heavy precipitation results. Southern Chile is lashed by these westerly winds and drenched with rain. As some of this Pm air moves equatorwards and meets Tm air, fronts are produced that explain and give rise to the winter rains of the "Mediterranean" region of central Chile. On the eastern side of the continent Polar air moves equatorwards via two routes, one along the Brazilian coast, the other by way of the Paraná-Paraguay valleys; both air streams move against Tropical air masses to produce fronts. Over the Caribbean Sea the Equatorial air mass is dominant. A low pressure prevails, causing an inward movement of vast volumes of moisture-laden air. This is unstable and accounts for the rains which occur during the summer season. This area too is visited by hurricanes which occasionally wreak great devastation.

In January (the southern hemisphere summer) the inter-tropical front has migrated southwards and a large portion of the continental interior stretching almost as far south as the Tropic of Capricorn is dominated by unstable Equatorial and Tropical continental air. Northern and central Brazil thus experiences its rainy season at this time of the year. Pacific Equatorial air prevails in the coastal regions north of the equator on the western coast and Atlantic Equatorial air in north-eastern Brazil. The North-east and South-east Trades bring abundant moisture to the Brazilian coastlands. But the heavy summer rainfall of the Atlantic margins of eastern and southern Brazil is in part due to fronts which develop from Polar air masses moving northwards against Tropical air.

On the western side of the continent Polar air moves equatorwards also, but it is stable air; skies are clear and this gives bright, dry weather north of 40 degrees S. In Central America the Caribbean area is affected by the southerly migration of the Atlantic sub-tropical high pressure, which results in the West Indies and the northern part of South America being deprived of rainfall at this time of the year. Moreover, the high pressure

TABLE I
Climatic statistics for selected stations

| | <i>J</i> | <i>F</i> | <i>M</i> | <i>A</i> | <i>M</i> | <i>J</i> | <i>J</i> | <i>A</i> | <i>S</i> | <i>O</i> | <i>N</i> | <i>D</i> | <i>Total rain- fall</i> |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|------------|---------------------------------|
| Mexico City (Mexico) 7411 ft | 54 0.2 | 57 0.2 | 61 0.5 | 64 0.8 | 65 1.9 | 64 3.9 | 62 4.5 | 62 4.6 | 61 3.9 | 59 1.6 | 56 0.5 | 54 2.2 | 22.8 |
| Mazatlan (Mexico) sea-level | 68 0.7 | 68 0.5 | 70 0.2 | 72 0.1 | 76 0.1 | 81 1.3 | 83 6.1 | 83 8.3 | 83 7.5 | 80 2.3 | 75 0.8 | 70 0.7 | 28.6 |
| Caracas (Venezuela) 3418 ft | 69 0.9 | 69 0.3 | 69 0.6 | 73 1.2 | 74 2.8 | 73 4.0 | 72 4.8 | 73 3.8 | 73 4.2 | 71 4.4 | 71 3.3 | 69 1.6 | 31.9 |
| Maracaibo (Venezuela) sea-level | 81 0.1 | 82 0.0 | 83 0.3 | 84 0.5 | 84 2.5 | 85 2.5 | 85 2.2 | 85 2.4 | 84 3.0 | 82 4.8 | 82 3.3 | 82 0.6 | 22.2 |
| Bogotá (Colombia) 8678 ft | 56 2.3 | 58 2.4 | 59 4.1 | 59 5.7 | 59 4.5 | 58 2.4 | 57 2.0 | 57 2.2 | 57 2.4 | 58 6.4 | 58 4.6 | 57 2.6 | 41.6 |
| Medellín (Colombia) 4950 ft | 71 2.7 | 72 3.5 | 71 3.3 | 71 6.6 | 71 7.7 | 71 5.5 | 71 4.1 | 71 4.6 | 70 6.2 | 69 6.9 | 69 5.2 | 70 2.5 | 58.8 |
| Guayaquil (Ecuador) 20 ft | 79 9.4 | 79 9.8 | 80 10.9 | 80 4.6 | 78 1.1 | 77 0.3 | 75 0.2 | 75 0.5 | 76 0.1 | 77 0.3 | 78 0.1 | 79 2.0 | 38.8 |
| Quito (Ecuador) 9446 ft | 59 3.9 | 59 4.4 | 59 5.6 | 58 6.9 | 58 5.4 | 58 1.7 | 58 0.8 | 59 1.2 | 59 2.7 | 59 4.4 | 58 3.8 | 59 3.1 | 43.9 |
| Trujillo (Peru) 197 ft | 77 0.2 | 77 0.5 | 74 0.3 | 72 0.0 | 68 0.0 | 63 0.0 | 64 0.1 | 64 0.0 | 64 0.0 | 67 0.0 | 69 0.1 | 72 0.0 | 1.2 |
| Cerro de Pasco (Peru) 14,270 ft | 44 4.6 | 43 4.5 | 44 3.6 | 44 3.4 | 43 2.3 | 41 0.9 | 40 1.1 | 41 1.2 | 41 2.8 | 42 3.3 | 42 3.4 | 42 3.7 | 34.8 |
| Iquitos (Peru) 348 ft | 78 10.0 | 78 10.6 | 76 12.0 | 77 6.6 | 76 9.8 | 74 7.3 | 74 6.5 | 76 4.5 | 76 8.9 | 77 7.1 | 78 8.5 | 78 11.3 | 103.0 |
| La Paz (Bolivia) 12,000 ft | 53 4.5 | 53 4.2 | 53 2.6 | 52 1.3 | 50 0.5 | 48 0.3 | 47 0.4 | 48 0.5 | 51 1.1 | 53 1.6 | 54 1.9 | 53 3.7 | 22.6 |
| Cochabamba (Bolivia) 8448 ft | 66 4.1 | 65 3.8 | 63 2.4 | 62 0.4 | 60 0.4 | 59 0.3 | 59 0.2 | 61 0.1 | 64 0.7 | 67 0.6 | 68 1.3 | 66 3.9 | 18.3 |
| Antofagasta (Chile) 308 ft | 69 0.0 | 69 0.0 | 67 0.0 | 64 0.0 | 61 0.0 | 58 0.1 | 57 0.2 | 57 0.1 | 58 0.0 | 60 0.1 | 63 0.0 | 66 0.0 | 0.5 |
| Santiago (Chile) 1706 ft | 69 0.1 | 68 0.1 | 64 0.2 | 59 0.5 | 52 2.5 | 47 3.3 | 48 3.0 | 50 2.2 | 55 1.2 | 58 0.6 | 63 0.3 | 67 0.2 | 14.1 |
| Puerto Montt (Chile) 30 ft | 60 4.6 | 58 4.4 | 56 5.9 | 52 7.4 | 50 10.6 | 46 10.0 | 46 10.8 | 46 9.3 | 47 6.3 | 51 5.5 | 54 5.5 | 57 5.4 | 85.7 |
| Punta Arenas (Chile) 30 ft | 51 1.5 | 51 0.9 | 47 1.3 | 44 1.4 | 40 1.3 | 37 1.6 | 35 1.1 | 37 1.2 | 40 0.9 | 44 1.1 | 46 0.7 | 50 1.4 | 14.4 |
| Buenos Aires (Argen- tina) | 74 3.1 | 73 2.8 | 70 4.3 | 62 3.5 | 55 3.0 | 49 2.4 | 50 2.2 | 52 2.4 | 55 3.1 | 60 3.4 | 66 3.3 | 72 3.9 | 37.4 |
| Rosario (Argentina) 98 ft | 77 3.3 | 76 3.3 | 71 4.3 | 65 3.6 | 57 1.9 | 50 1.3 | 52 1.3 | 53 1.6 | 57 2.1 | 62 3.4 | 69 3.6 | 75 4.5 | 34.2 |
| Salta (Argentina) 3865 ft | 71 6.5 | 71 6.2 | 69 4.0 | 63 1.3 | 57 0.4 | 50 0.1 | 52 0.0 | 53 0.2 | 57 0.3 | 62 1.2 | 62 2.4 | 75 5.2 | 27.8 |
| Asunción (Paraguay) 456 ft | 80 5.7 | 80 5.2 | 78 4.8 | 72 5.5 | 67 4.7 | 63 2.8 | 64 2.3 | 66 1.6 | 70 3.3 | 73 5.6 | 76 5.8 | 80 6.1 | 53.4 |
| Pôrto Alegre (Brazil) 30 ft | 77 3.5 | 77 3.2 | 74 3.9 | 69 4.1 | 62 4.5 | 57 5.1 | 57 4.5 | 59 5.0 | 62 5.2 | 65 3.4 | 70 3.1 | 75 3.5 | 49.0 |
| Santos (Brazil) sea-level | 78 11.0 | 78 9.8 | 77 12.3 | 74 7.3 | 70 6.1 | 68 5.7 | 67 4.3 | 66 4.1 | 69 5.7 | 70 6.4 | 73 7.7 | 76 7.8 | 88.2 |
| Goiás (Brazil) 1706 ft | 75 12.5 | 76 9.9 | 76 10.2 | 77 4.6 | 75 0.4 | 72 0.3 | 72 0.0 | 76 0.3 | 79 2.3 | 78 5.3 | 76 9.4 | 75 9.5 | 64.7 |
| São Salvador (Brazil) 150 ft | 80 2.6 | 80 5.3 | 80 6.1 | 79 11.2 | 77 10.8 | 75 9.4 | 74 7.2 | 74 4.8 | 75 3.3 | 77 4.0 | 78 4.5 | 78 5.6 | 74.8 |

Note. The first line of figures against each town are the temperatures in °F, and the second line of figures rainfall in inches.

developed over North America in winter sends cold air streams issuing southwards and is responsible for the *northers* which sweep across the Mexican plateau as far south as Mexico City and across the Gulf of Mexico to the northern coast of the Isthmus of Tehuantepec, where they are common during the winter season and are accompanied by heavy rainfall.

HUMIDITY AND RAINFALL

The main area of heavy rainfall lies in the inner Amazon Basin, where a mean annual precipitation of over 80 in. occurs. Rainfall is heavy in the Amazon Basin almost throughout the year; there is a short relatively dry season, but it is of little real significance. While virtually continual rains

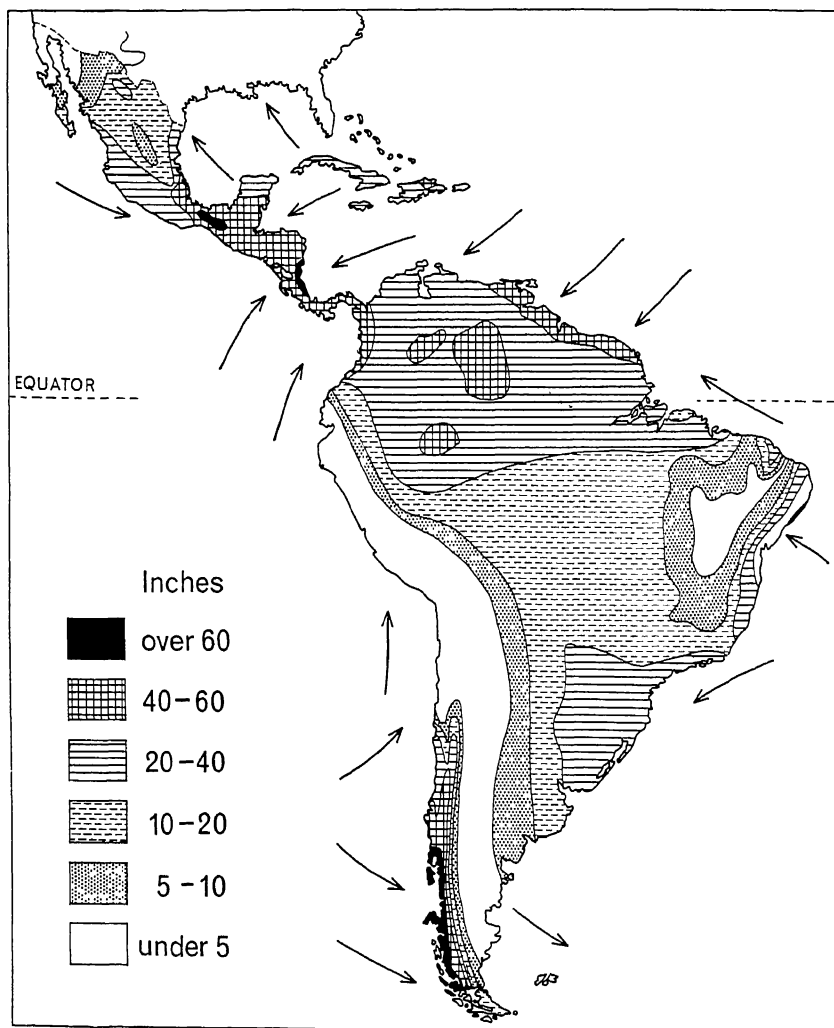


FIG. 10.—Rainfall: May to October.

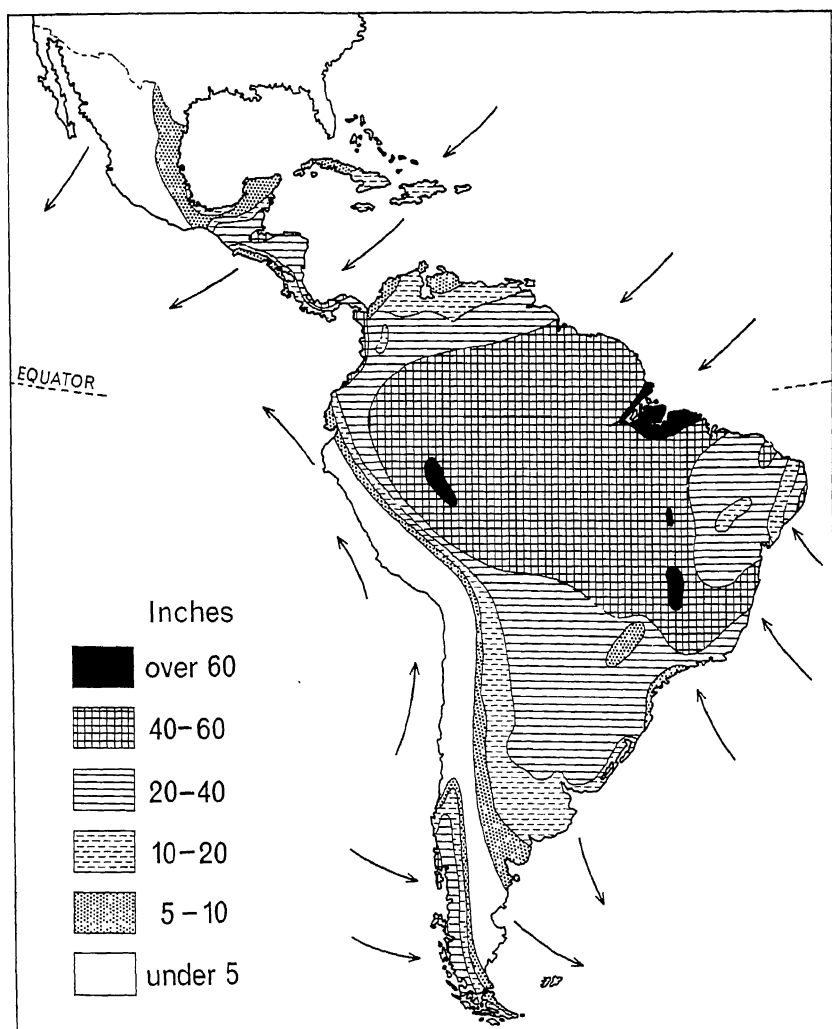


FIG. 11.—Rainfall: November to April.

are experienced in the heart of the Basin, to the north and south seasonal summer rains following the vertical sun occur. These rains, both in the Amazon Basin and the adjacent territories, are due to the equatorial low-pressure belt reinforced by vast volumes of moist air brought in by the North-east and South-east Trade Winds. This indraught of moisture-laden air would seem to be motivated by the low-pressure system in the continental interior. Thus the rainfall has a twin causation.

There is a high rate of evaporation from the swampy, forested lowland of Amazonia, and the high degree of humidity makes the air oppressive and the climate enervating. It is this condition which makes the climate

trying rather than the temperatures, which though uniformly high are not extremely high. Convection results in heavy precipitation each day. Torrential rains, frequently accompanied by thunder and lightning, happen daily, although the period of the downpour may be relatively short.

The other areas in Latin America where abundant rainfall occurs lie where coasts run athwart in-blowing airstreams, and particularly where such coasts are backed by steeply sloping land. Five areas with these conditions are distinguishable and all suffer heavy rains: (1) the Caribbean coastlands of Central America facing the North-east Trades; (2) the Guiana and Amazon coastal lands receiving the North-east Trades; (3) the south-eastern margins of the Brazilian Highlands facing the South-east Trades; (4) the coasts and Andean slopes of southern Chile facing the prevailing Westerlies; and (5) the Pacific coastlands of Colombia, where there is a strong inflow of moist air from the south-west producing a monsoonal effect.

Latin America has a relatively small proportion of its total land area deficient in rainfall. Though there are extensive areas with only seasonal precipitation, arid or semi-arid conditions are restricted to four main regions: the north-western portion of Mexico, the shoulder region of north-eastern Brazil, Patagonia and the north-west of Argentina, and the coastlands of northern Chile and Peru. The conditions of aridity and semi-aridity are due to different causes. In Mexico drought is due in the main to out-blowing winds, which in winter issue from the high-pressure system that develops over the south-western United States. The semi-arid region of north-eastern Brazil is not easily explained, but is partially accounted for by the sub-tropical high-pressure area of the South Atlantic which extends across the continent to link up with the South Pacific high-pressure system. Severe droughts extending over one, two, or even three years may occur in this region.

In the case of Patagonia and north-western Argentina the reason for the aridity may be squarely placed on the Andes, which form a high wall preventing the influence of the North-Westerlies reaching the eastern side. While the windward-facing slopes in southern Chile are drenched with heavy rains, the leeward slopes lie in the rain shadow area and are dry. The coast lands of northern Chile and most of Peru form one of the most arid belts of desert in the whole world. Strangely enough winds from the south blow onshore but are chilled as they travel over the cold Humboldt Current; when they reach the land they are warmed and so fail to deposit their moisture although mists are sometimes formed along the sea-coast and at moderate heights inland. These dry regions also suffer the highest variability in rain; contrariwise, the humid areas have a more reliable precipitation.

Summing up, it may be said that the distribution of precipitation bears a very close relationship to the distribution of pressure, to the direction of the winds, and to the disposition of the relief.

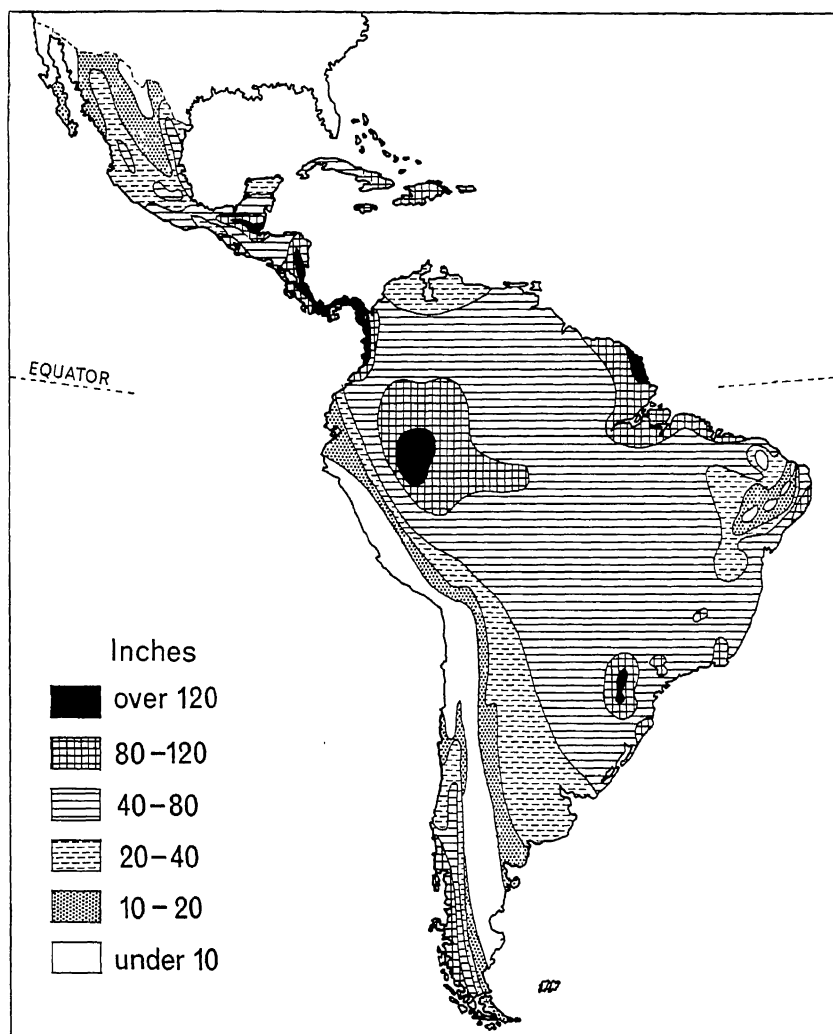


FIG. 12.—Annual rainfall.

ELEVATION

Altitude plays a very important role in determining the climates of considerable areas of Latin America. In spite of the fact that such a large proportion of the region lies within the tropics, a large area of this tropical territory does in fact have a temperate, and in parts even a cold, climate. These climates are intimately related to altitude and are best exemplified in the Andean zone—on the high intermontane plateaus and sierras—although they are present in other highland areas. Indeed, in the more elevated areas of Latin America the people think of climate more in terms of altitude than of latitude.

The more elevated areas possess climates which are commonly classified into vertical zones. Although all the basic elements of weather and climate—temperature, humidity, pressure, and winds—suffer modifications with increasing elevation, temperature is the over-riding factor or criterion in zonal classification. Three main zones are usually recognised in the higher lands of Latin America: the *tierra caliente*, *tierra templada*, and *tierra fria*.

The *tierra caliente* or “hot country” is the low country, usually below 3000 ft, where hot, wet conditions prevail. The *tierra caliente* is, in effect, a vertical extension of the conditions characterising the equatorial lowlands. The *tierra templada* or “temperate country” normally lies between 3000 and 6000 ft, but sometimes reaches up to 8000 ft. Above the temperate lands is the *tierra fria* or “cold country.” This cold land, usually lying above 6000 ft, is a zone where frost occurs. The upper limit of the *tierra fria* is approximately 10,000 ft in equatorial latitudes and somewhat lower farther away from the equator. Above the *tierra fria* lies the zone of alpine pastures known as *paramos* which extend from about 10,000 ft to the snowline at approximately 15,000 ft. The snow-capped peaks of the Andes are in a climate of perpetual frost.

The high uplands and mountain slopes with their “vertical climates,” as they are sometimes called, are important from the point of view of human settlement. Because of their lower temperatures they have provided suitable habitats for man in areas which otherwise are persistently hot and not very attractive. To immigrant Europeans and their descendants they have proved to be especially attractive, since the conditions prevailing in the highlands bear some resemblance to the temperate climates of mid-latitudes. It is significant that in the Andean zone the greatest concentrations of population are found in the highlands; in Brazil, too, the most important part of the country is the east central portion of the plateau.

CLIMATIC REGIONS

The map (Fig. 13) shows the climatic regions of Latin America. The *hot, wet equatorial* type is found throughout most of the Amazon Basin, along the coasts of the Guianas, and in the Pacific coastal zone of Colombia. This climatic type is characterised by uniformly high but not extremely high temperatures, usually 70° F (21° C) or more in every month with an annual range of less than 5° F; annual rainfall of at least 60 in. and frequently considerably more which is fairly equally distributed throughout the year; and a daily as opposed to a seasonal cycle, which makes for monotony. Tropical rain forest is the natural vegetative response to the ever wet, ever hot conditions.

Very similar to the above type is the *tropical marine* variety, sometimes called trade wind littoral type, which is found along the coastlands of eastern Brazil approximately as far south as the Tropic of Capricorn, in the West Indies, and along the east coast of Central America. In these areas the mean annual temperature is at least 70° F (21° C), while the yearly

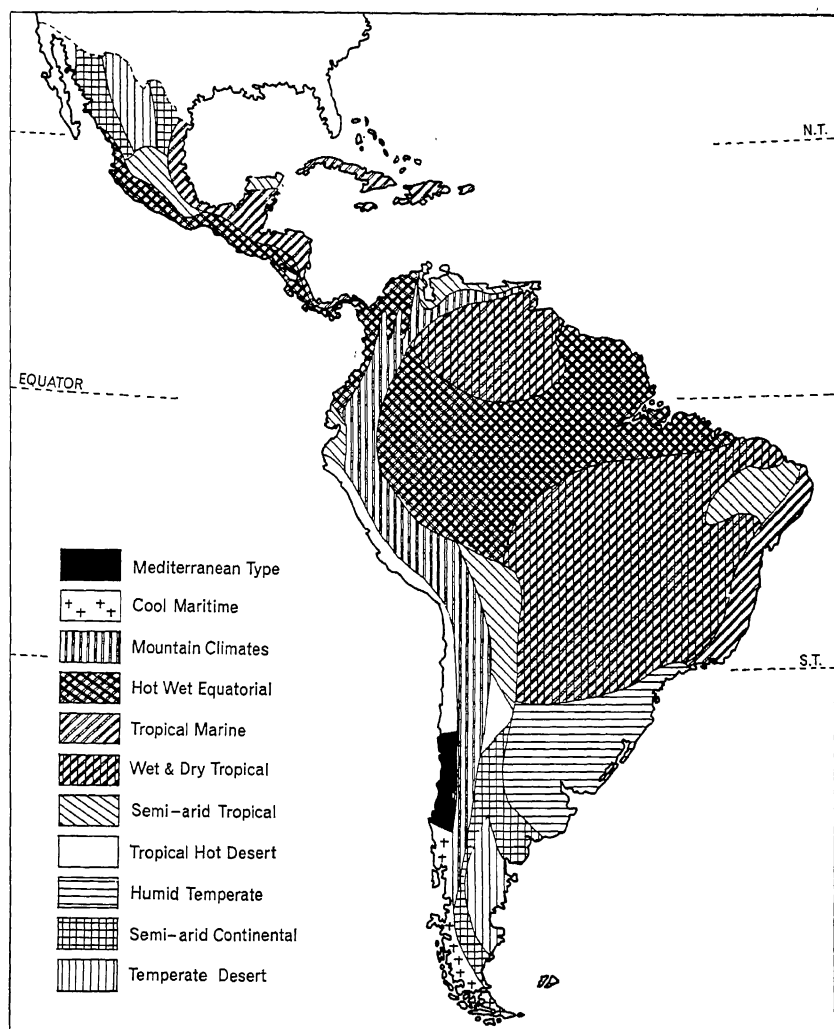


FIG. 13.—Climatic regions of Latin America.

range is under 20°F (11°C); precipitation is over 35 in., and no month is entirely rainless. The chief differences between this type and the equatorial lowland are twofold: rainfall is mainly due to exposure to the Trade Winds and there is a greater variation in the amount of rainfall.

The *wet and dry tropical* type, sometimes called the savanna climate, occurs polewards of the equatorial type. It is found in patches in the uplands of Central America south of the northern tropic, in the Orinoco basin, in the Guiana Highlands, and over most of the Brazilian Highlands. Small areas of it occur in all the Andean countries. The outstanding feature of the climatic regime is the seasonal alternation of wet and dry

conditions, though the lengths of these respective seasons vary from place to place. Mean annual temperatures are at least 70°F (21°C), but summer temperatures may be very high, soaring into the 90s, or even exceeding 100°F . Annual ranges, though likely to be greater than 10° , are seldom over 20°F . A distinct winter dry season is followed by heavy rains in summer, which commonly amount to anything between 30 and 60 in. The seasonal rhythm results in tropical grassland vegetation or savanna, since the dry season puts a limit on tree growth.

The *semi-arid tropical* type, a type which again may be thought of as a variety of the savanna climate, is of limited occurrence, being found on the interior plateau of southern Mexico and in the northern portion of the peninsula of Yucatán, along the narrow coastal margin of Venezuela, in parts of western Peru and Bolivia, and in the interior section of the shoulder of Brazil. Mean annual temperatures are high, at least 70°F (21°C), with an annual range of less than 25° . Rainfall is typically light, 10–35 in., with the winter half of the year being virtually rainless. From a geographical point of view, however, it is the uncertainty of the rainfall—its unreliability and variability—rather than the smallness in amount that is so important.

The *tropical or hot desert* type of climate is found in the peninsula of California, in a narrow strip along the west of South America from the Gulf of Guayaquil in Ecuador to 30 degrees S., and immediately east of the Andes in west central Argentina. In these areas the mean annual temperatures are 70°F (21°C) or over, while the annual rainfall is under 10 in. Akin to this type is the temperate desert climate found in the northern part of the Mexican Plateau and in Patagonia; the main difference lies in the temperature, which is decidedly lower, particularly during the winter.

The *humid temperate* climate occurs only in South America and is characteristic of the eastern portion of Argentina north of approximately 38 degrees S., the whole of Uruguay, and the panhandle of southern Brazil. The hottest month reaches 80°F (27°C) or thereabouts; the coldest month is above 40°F (5°C). Rainfall occurs in every month, is fairly well distributed throughout the year, and totals 30 in. or more. Coastal localities receive the heaviest precipitation.

Westwards and polewards of the humid temperate type is to be found the *semi-arid continental* climate. Temperature conditions are much the same as in the humid temperate type, but precipitation is smaller, varying between about 6 and 20 in., but with a summer maximum.

The *Mediterranean* type of climate is of strictly limited occurrence in Latin America, being confined to Central Chile. Temperatures are moderately high the year round, with the coldest month above 45°F . Rainfall, which varies between about 10 in. on equatorward margins and 30 in. on poleward margins, comes during the winter season (April to September), summer being a time of drought. As in the Mediterranean Lands of Europe, the rains come with the shift in the wind belts and the onset of westerly winds and the occurrence of cyclonic storms.

The southern third of Chile lies in the track of westerly winds which prevail throughout the year. This narrow coastal belt has a *cool maritime* type of climate. Moderate temperatures, usually between 40° and 60° F (5° and 16° C), with plentiful rainfall and no month rainless are the characterising features. Southern Chile is distinguished by its equable conditions, drenching rains and high winds. Southwards of latitude 50 degrees S. there is a small area having a tundra type of climate. Here all months have under 50° F (10° C). The sierras and higher plateau areas of the Andes may be said to have a similar type of *mountain climate* perhaps best designated Alpine.

NATURAL VEGETATION

In any region the physical elements—landforms, climate, vegetation, soils—are interdependent, with each affecting, in greater or smaller degree according to circumstances, the other components of the physical landscape. A very complex inter-relationship exists; this, however, is not always apparent. In this section on vegetation, and in the next on soil, we shall note how interaction and inter-dependence show themselves. The physical pattern becomes further complicated when animals and man enter upon the scene, for they can modify the “natural” conditions appreciably.

Natural vegetation is very largely a reflection of the climatic conditions, but slope, soil, and drainage also exert notable influences which, locally at all events, may modify the vegetation type. Human and animal interference, *e.g.* by clearing woodland, burning the vegetation, draining land, over-grazing, etc., may effect serious changes in the natural vegetative cover over considerable areas. It should be remembered, too, that man is prone to introduce plants that are of economic value to him, and in this way he may modify the vegetation. While there are areas in Latin America where the natural vegetation has been replaced or substantially modified by “cultivated” vegetation, *e.g.* in the Argentine pampas and Central Chile, by and large the region, more than most continental areas, retains its natural vegetation.

The arrangement of the natural vegetation of Latin America forms a relatively simple pattern. It does become complicated, however, in the Andean area and in Central America, where the elevation induces vertical climates which, in turn, produce altitudinal vegetation zones. The map (Fig. 14) gives a generalised picture of the natural vegetation.

CLIMATE AND VEGETATION

In a broad way it may be said that vegetation is essentially a response to climate. Of the climatic factors, temperature and moisture, whether by actual amount or seasonal incidence, are of dominant influence. In general, the vegetation type, whether it is forest, grassland, or desert, is conditioned by moisture; on the other hand, the flora, *i.e.* broad-leaved forest, coniferous forest, savanna, steppe, etc., is determined by

temperature. Expressed in another way, rainfall determines the great plant associations of forest, grass, and scrub, while temperature varies the detail within each association.

Each of the three great plant associations are found represented in Latin America, but each exhibits a variety of forms with distinctive plant types and species. The forest is represented by tropical, temperate, and cold forests, which, in turn, show sub-varieties. The grassland is represented in its tropical and temperate forms, which again display sub-types. Scrub or desert vegetation offers a variety of forms, ranging from an impoverished scrub "forest" to virtually lifeless, barren desert.

In the past, while due cognisance has been given to such factors as soil, slope, drainage, and other local determinants, climate (embracing precipitation, evaporation, temperature, and sunlight) has been held to be basically responsible for the widespread occurrence of a particular association. More recently this climatic control has been questioned, and the problem merits a brief discussion.

VEGETATION AND MAN

It has long been held that the tropical grasslands are a response to a climate with alternating seasons of summer rainfall and winter drought. Many authorities, however, now question this climatic origin and believe that the tropical grasslands, at least in their present aspect, do not represent a true climax vegetation, *i.e.* the final stage in the evolution of a vegetation cover through plant succession. It is averred that the grasslands, as they now appear, are entirely or at least partially man-made, being the product of tree clearance, shifting cultivation, and periodic burning over a long period.

While it is true that burning of vegetation was a common procedure among primitive peoples in the past for such purposes as driving game or improving pasture for animals, one finds it difficult to believe that these very extensive American savannas were due to human interference, particularly in view of the fact that these same areas must always have been, as in truth vast areas still are, very sparsely peopled. One can more readily conceive the African grasslands of the Sudan as being man-made, for historically they have always been well-peopled. That certain areas of the American savannas are the result of man's interference may be readily conceded; it is less easy to accept a human origin for them in their entirety. In this connection Koeppe and de Long make an interesting point: "Many savanna trees, such as the acacias, of which there are several hundred varieties, are flat-topped, except where there is sufficient rainfall to promote more mature growth. The flatness is suggestive of the fact, if it is not proof, that grasslands are indigenous to the climate and that the trees are neither more numerous nor taller because precipitation is insufficient to keep the ground moist enough throughout the year to nourish full-fledged trees."*

* *Weather and Climate*. McGraw-Hill. 1958. Pp. 210-11.

The same argument—that the grassland has been formed and maintained by man—has been advanced for the temperate grasslands though there is more uncertainty in this case. The fact that historically the temperate grasslands have been essentially uniform and suffered no change suggests that they are climatically determined and result solely from the response of plant life to temperature, rainfall, evaporation, and soil conditions.

THE FORESTS

Varieties of tropical forest cover very extensive areas in Latin America. Three main sub-types may be distinguished: tropical rain forest, tropical semi-deciduous forest, and tropical scrub-forest.

The tropical rain forest or *selva* is a luxurious broad-leaf evergreen type occurring in areas where rainfall is heavy and moisture abundant throughout the year and where temperatures are always high. The *selva* covers most of the Amazon basin, much of the eastern coastlands between approximately 30 degrees S. and 20 degrees N., and the west coast of South America from the Gulf of Guayaquil to Panama. While forest covers most of these areas, patches of thorny jungle and savanna are found in amongst it where, for example, local "dry" spots occur or porous gravelly soils are found. The *selva* in its most characteristic form—thick, luxuriant, stratified, with a great variety of species and numerous lianas, epiphytes, and parasites—occurs in the basin of the Amazon, which forms the largest single area of equatorial forest in the world.

The tropical semi-deciduous forest, which is composed of large broad-leaved trees of mixed deciduous and evergreen species, is found throughout most of the West Indies, on the Pacific coastlands of Central America between approximately 8 and 20 degrees N., and over a wide area of south-eastern Brazil and eastern Paraguay.

Tropical thorn forest is associated with areas having semi-arid or sub-humid climates, such as the north-eastern shoulder of Brazil and parts of the northern plateau region of Mexico. Broad-leaved deciduous trees with shrub forms occur in dense thickets or are scattered more openly. In Brazil this dry scrub-forest with its thorny succulent plants is known as *caatinga*.

Mid-latitude or temperate forests are represented in Latin America but cover relatively small areas. They are found in southern Mexico, in southern Brazil, and southern Chile; also in the higher altitudes of the great mountain ranges. On the hills and ridges of the central plateau of Mexico mixed broad-leaf deciduous and needle-leaf evergreen forest occurs. A similar growth is found on the plateau of southern Brazil, where the so-called Araucaria forest, composed of mixed pine and broad-leaved species, covers a considerable area and provides Brazil with its chief supplies of commercial timber. The forests of southern Chile are mostly deciduous, but some needle-leaf evergreens are also found. The abundant precipitation on the mountain slopes has encouraged a very dense growth of trees with a well-developed underbush. The only

considerable area of true coniferous forest is to be found on the Sierra Madre Occidental of Mexico, and even here the pine forests grow in patches rather than as a continuous forest cover.

In central Chile, which is characterised by a "Mediterranean" regime of climate, a distinctive type of scrub-forest and bush is found. Eucalyptus trees, Lombardy poplars, and weeping willows, together with many broad-leaf and evergreen shrubs, go to make a unique and beautiful landscape.

THE GRASSLANDS

Both tropical and temperate varieties of grassland are to be found in Latin America. The plateau areas of South America, as well as a large

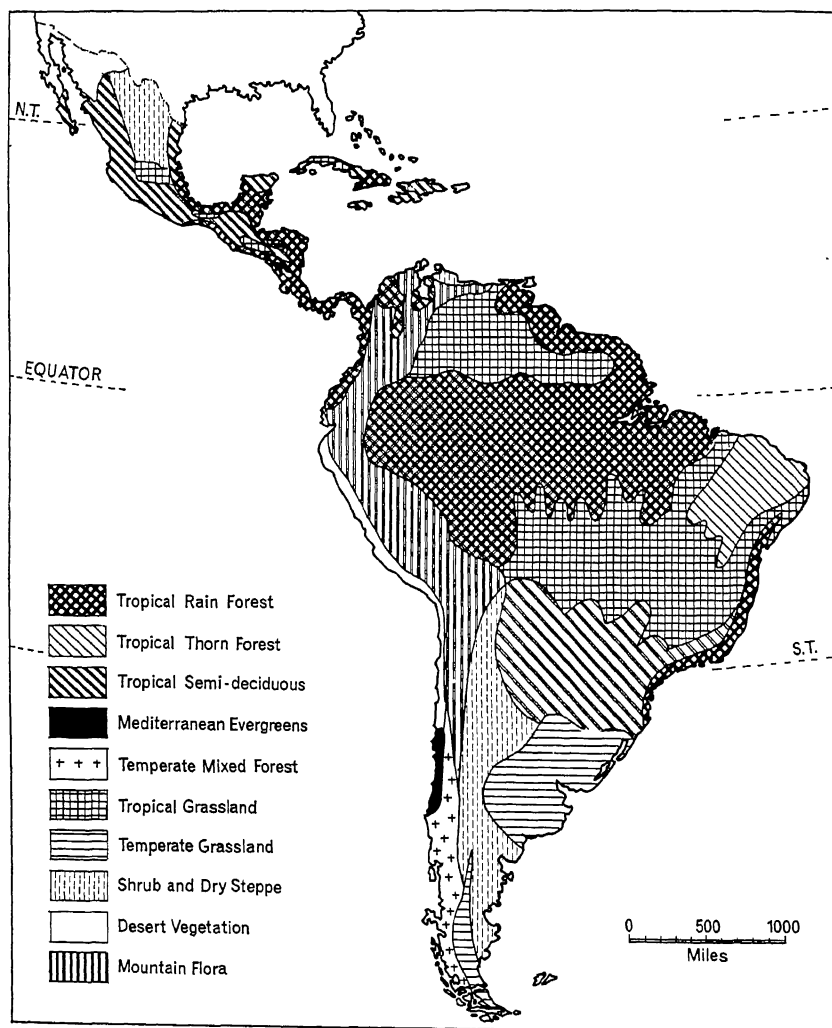


FIG. 14.—Natural vegetation of Latin America.

part of the Orinoco basin, are covered with tropical grassland, or savanna. Two varieties are commonly distinguished. (1) Dry savanna occurs in well-drained areas that are subject to seasonal (winter) drought, and has dry, coarse grasses, 3–8 ft tall, with scrub trees found occasionally in clumps but more often scattered. The proportion of trees and scrub varies widely, however, between area and area. The grasslands of the Brazilian Plateau are generally called *campos*. In the Orinoco basin they have been given the special name of *llanos*. (2) In areas which are subject to inundation, *e.g.* the south-western portion of Brazil and parts of Paraguay, wet savanna occurs; such areas have a richer growth of grass, but trees are absent.



[Courtesy: C. and M. Haywood.]

FIG. 15.—Llanos country, Colombia.

The temperate grasslands are largely confined to the area around the estuary of the Río de la Plata. Here are found the *pampas* of Argentina and Uruguay. Tall grasses, often with plumes, are found in the more humid areas; shorter, wiry, bunch-grasses where the rainfall is less, as towards the west and south, where the grasslands merge into semi-desert. The pampas are completely treeless except along watercourses. Rather distinct from the pampas is the belt of short grass which is found in narrow strips along the eastern lower slopes of the Andes in Patagonia and in a few localities in northern Mexico.

THE DESERTS

Because of the narrowing of the land mass in tropical latitudes and the disposition of the mountain ranges, Latin America has none of the great

stretches of desert which are so strikingly displayed in the other southern continents of Africa and Australia.

Latin America's dry lands are characteristically covered with xerophytic scrub, a light, scattered growth of low-growing, drought-resisting herbaceous plants and shrubs. In the semi-arid areas of northern Mexico and north-western Argentina a kind of scrub-forest of an impoverished nature is occasionally found; this vegetation of low, stunted, dwarf trees is known as *monte*. Patagonia, rather cool and wind-swept, forms an area more or less of desert but with dwarf shrubs growing singly or in groups. The only area where vegetation is almost or completely absent is the Atacama Desert along the Pacific coastal margins of Peru and northern Chile. Aridity here is almost absolute and but for the Andean streams which flow westwards across this coastal zone bringing life-giving water, no plants could grow. In the peninsula of Lower California and in the Sonoran Desert of Mexico desert conditions also prevail, though there is not the extreme aridity here as in the Atacama and there is a scattering of broad-leaved evergreen shrubs and a variety of succulents.

Conditions approaching semi-desert occur on the high intermontane Andean plateaus. These high, cool, wind-swept tablelands or toplands carry patchy grass and scattered herbaceous plants. On the high sierras, approximately 15,000–16,000 ft, cold desert with perpetual frost and snow prevails.

SOILS AND SOIL EROSION

Soil is a most valuable resource. Like water, it is all too often taken for granted. Without soil the peoples of Latin America or, for that matter, any other region of the earth, could not live, since the bulk of the food of mankind is derived from land-based crops, which, in turn, are dependent upon the soil. Soil takes a long time to form, but is very quickly exhausted and very easily lost. Much care and attention should, therefore, be directed towards soil protection and management. Unfortunately, man has become aware of this need only recently, with the result that in many parts of the world, including Latin America, much damage has been done to the soil cover; it has become either impoverished or, worse, irretrievably lost.

Soil, which may be defined as the thin, superficial layer of weathered or disintegrated and decomposed material on the land surface, is the product mainly of inorganic mineral matter derived from rotted rock, organic material, or humus derived from decayed vegetable matter, water, and air. The soil is a dynamic zone where complex physical, chemical, and biological activities are continually in process; thus it is a constantly changing and developing material. While parent material is an important factor influencing many soil qualities, such as texture and structure, climate appears to be the dominant factor in soil formation and soil type.

Generally speaking, the soils of Central and South America follow the

climatic pattern, thus supporting the foregoing contention, although there are many local exceptions arising out of, or associated with, distinctive rock types, topography, and vegetation. By and large, however, the general rule that climate is the principal factor determining soil formation and type obtains in Latin America as elsewhere in the world.

SOIL TYPES

In the region east of the Andes and north of the Tropic of Capricorn to the Caribbean is a vast area dominated by tropical soils of a lateritic character. Included in this region are the entire Amazon Basin and the Brazilian and Guiana Plateaus. Outside this major area similar type soils occur along the Ecuadorean coast, in portions of north-western Colombia and in the Caribbean and Pacific lowlands and West Indian islands as far north as the Tropic of Cancer. Throughout most of Amazonia the soils are severely leached and lacking in soluble mineral matter. Along the floodplains of the rivers of the basin the soils are ill-drained, and over large areas are susceptible to inundation during part of the year. Although better drainage occurs on the higher ground, the soils are still wanting in soluble salts and humus is deficient. The soils of Amazonia, though inherently poor, can no doubt be made productive, but artificial drainage, skilful management, and the application of large quantities of mineral fertiliser will be needed. It is probably the generally poor quality of the soils, along with the dense forest cover, rather than the climate, that has been the greatest deterrent to effective settlement in Amazonia.

Laterisation or the accumulation of hydrated oxides of iron and aluminium as a result of leaching by percolating water under high-temperature conditions is characteristic of tropical soils. It is a tendency peculiar to all hot, humid lands. Some soils are pure laterite, that is, they become indurated with hydrated iron oxides; such reddish-coloured soils are completely sterile and utterly infertile. "Laterite," says Professor Pierre Gourou,* "is a pedological leprosy which occurs only in hot, wet climates with an alternation of dry and rainy seasons." Pure laterite does occur occasionally within the tropical belt of Latin America, but not, fortunately, over wide areas.

The general infertility of the soils of the humid tropics is frequently not recognised. Because vegetation proliferates it is assumed that the soils must be fertile; the truth is, of course, that it is the abundant moisture and great heat, not the soils, which are conducive to luxuriant plant growth. While recognising the general infertility of tropical soils, it should be noted that exceptions to the general rule do exist; well-drained alluvial plains, coastal lowlands of recent emergence, and newly formed volcanic soils usually provide exceptions.

In the interior plateau region of Brazil soils are poor. The hilly lands of ancient crystalline rocks are highly leached, while the tabular sandstone uplands possess light-coloured sandy soils which are quickly exhausted.

* *The Tropical World*. Longmans, Green & Co. 1953. P. 21.

In the southern part of the plateau, however, on the hilly uplands, on the diabase plateau and in the intervening alluvial valleys, are to be found the most fertile soils in Brazil. Of special interest is the *terra roxa* or red earth known as the "coffee soil." This is derived from the weathering of the diabase or basic igneous rock. It is particularly well suited to coffee growing on account of its mineral content and porosity. In this instance the special quality of the soil appears to depend more upon the parent rock material than upon climate. Though perfectly suited to coffee growing, *terra roxa*, on the other hand, does not suit maize or cotton. It is worth emphasising at this point that a soil which is ideal for a particular crop is not necessarily a good soil for all crops. The chief disadvantage of *terra roxa* is that, when not properly cultivated, it is highly susceptible to erosion. In the dry north-eastern shoulder of Brazil lateritic soils are replaced by areas of chestnut brown soils.



[Courtesy: C. and M. Haywood.]

FIG. 16.—Land, in Colombia, severely eroded and irredeemable. Not all the areas affected by soil erosion are as bad as this.

In temperate South America, soil types closely reflect the amount of precipitation. In the Pampas and Arid West regions of Argentina roughly longitudinal zones of humid prairie, chernozem, chestnut brown, and grey desert occur successively from the coast interiorwards. These soils are correlated with maize cultivation and humid grazing, wheat farming, semi-arid grazing, and irrigated oasis agriculture, respectively. The chernozem soils are particularly noteworthy because of their astonishing fertility; though long cultivated, they show little sign of exhaustion.

These soils are, in part, derived from aeolian deposits and are loessal in character. Deep, stoneless, porous, and well supplied with organic matter and soluble salts, they are rich and valuable soils highly suited to tillage. West of the belt of chernozem soil a hardpan tends to develop in the soil: this accumulation of salts makes cultivation difficult even where water supplies are available for irrigation.

Along the Pacific margins a variety of soils occur. In southern Chile heavy rainfall throughout the year, cool temperatures, and forest cover cause the soils to be podzolic. Grey-brown podzols or true podzols occur. The former are fairly fertile, but require feeding with mineral fertilisers. The large quantities of natural nitrate found in the arid desert region of northern Chile provide ample supplies of nitrate, and in this respect Chile is very fortunate. Desert soils are characteristic of the arid coastal areas of northern Chile and Peru. Rich in mineral constituents, these soils yield prolific crops under irrigation with careful management. On the Andean highlands mountain soils of various types occur.

In Central America topographic diversity and altitudinal climates give rise to a wide variety of soils. Lateritic soils cover wide areas, however, in the isthmian states and the West Indies. In Cuba, Jamaica, Hispaniola, and Puerto Rico the warm, humid climate has resulted in deep weathering of the rocks; soils vary in their character, colour, and value from place to place, but there are considerable areas having deep and fertile soils. In many places in Central America and the Indies rich volcanic soils are found. Mexico shows a wide range of soil types. In the peninsula of Yucatán the porous limestone soils are lateritic. Laterisation is also characteristic of the soils on the Pacific coastal lowlands south of Cape Corrientes. North of the Cape and on the coastal plains of the Gulf of Mexico, red and yellow sub-tropical forest soils occur. The Central Plateau of Mexico tends to have soils of the humid prairie type, while the Northern Plateau has chestnut-brown steppe soils which degenerate north-westwards into grey and brown desert soils.

SOIL EROSION

The farmer in Latin America, whether he be cultivator or stock-raiser, is faced with many problems. Not least of these problems is that of soil erosion. Over most of Latin America soil erosion is almost universal on cultivated lands. Torrential rains on steep slopes play havoc with the soil if the vegetative cover is removed, and sheet erosion and gullying have devastated wide areas. In forested areas, once the tree cover is removed, the soil becomes subject to erosion; slopes need not necessarily be steep: even gentle gradients are subject to attack, as the Ford Motor Company found when it set up rubber plantations at Fordlandia in the Amazon basin.

Steep slopes, which are so characteristic of the Andean region and of many of the West Indian islands, demand careful husbandry if the soil is to be preserved. Terracing really becomes an essential prerequisite for tillage. Not only does terracing prevent soil erosion and soil loss but it

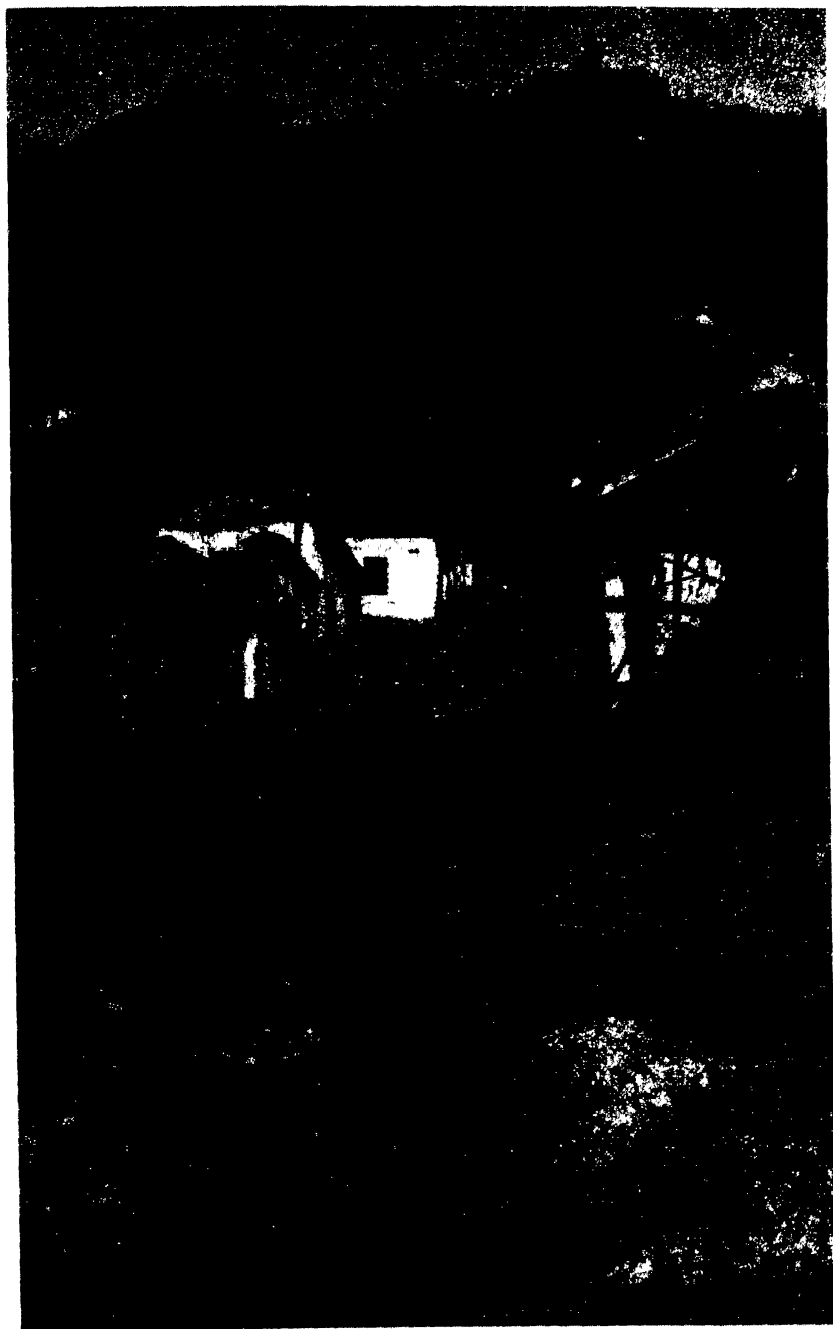
also enables hill slopes, which in their natural state are incapable of being utilised, to be made cultivable. For instance, the old system of terracing, the *andenes*, which was practised by the native cultivators of the Peruvian Andes, made possible the productive utilisation of slopeland, land which under a modern system of cultivation would be incapable of use (Fig. 17).



[Courtesy: Bolivian Embassy.]

FIG. 17.—Only by the arduous and painstaking construction of terraces was it possible for the Andean Indians to cultivate the steep slopes.

One of the causes of soil erosion is the system of shifting agriculture practised by the primitive Indian groups in Latin America. The aboriginal cultivators in times gone by cleared land of its forest cover either by cutting down or burning the trees and then planted crops. The patches of virgin land were cultivated for three or four years and then, when the fertility of the pristine land was exhausted, the cultivators moved on and repeated the process. The land was allowed to revert to nature. This progressive system of cultivation was handed down by the indigenous peoples and continues to be practised by the primitive Indian agriculturalists. The system goes under various names, *e.g.* *milpa* cultivation in Mexico, *conuco*



[Courtesy: C. and M. Haywood.]

FIG. 18.—This deeply eroded gully, along a street, was cut by the torrential rain of a single thunderstorm!

cultivation in Venezuela, and *roça* cultivation in Brazil. The term "milpa" has come to be used commonly to describe this primitive shifting system.

This system worked reasonably well in former times in regions where the rainfall was not excessive, the slopes were not easily eroded, and where the population density was low. Land which had been cleared was allowed sufficient time to recuperate and, after a period of perhaps thirty years, its fertility had been restored. "From the point of view of land conservation," says Professor Stamp, "the shifting cultivation common in much of tropical America is wasteful of land and gives but small returns, but is conservative of both the soil and the soil fertility."* Unfortunately in many areas, such as Guatemala, Honduras, and parts of Mexico, where there was undue pressure of population, the land did not get the chance to recuperate and the milpa system wrought progressive deterioration, leading eventually to complete destruction, of the land. Thus a system which is defensible under primitive conditions and under conditions of low population density becomes untenable at the present time, when the pressure of population upon limited cultivable land is high. When one considers that the milpa system is dominant over vast areas of tropical

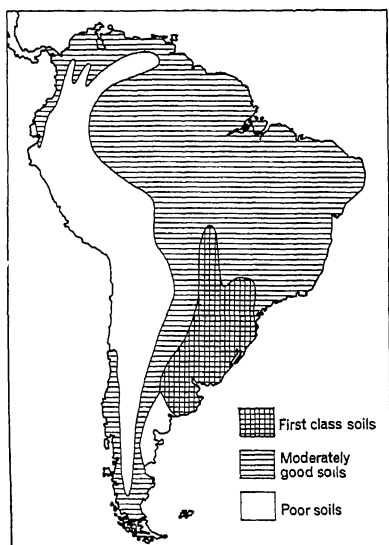


FIG. 19.—Soil values in South America.

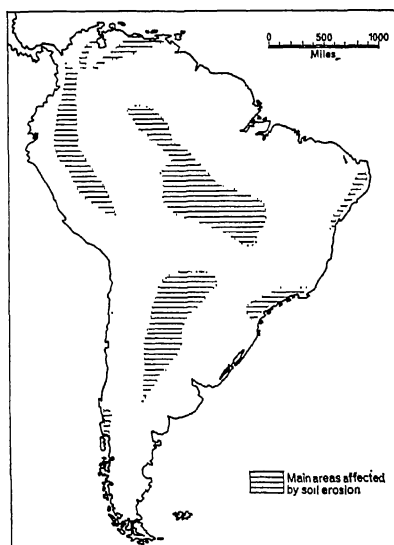


FIG. 20.—Chief areas of soil erosion in South America.

Latin America the threat to the soil looms large. Already much good land has been lost, and if the system is allowed to go on unchecked the outcome may well be disastrous.

In other parts of Latin America which are not under the milpa system, wanton misuse of the land has taken place. Nowhere is this more apparent

* *Our Undeveloped World*. Faber and Faber. 1952. P. 157.

than in the coffee lands of Brazil. The *terra roxa* soils, it is true, are prone to erosion, but extensive areas in the hinterland of Río de Janeiro and Santos are gashed and gullied by erosion. This has been caused by the wasteful use of the land: since land was abundant and cheap, it was easier to clear new land for planting coffee than to try to maintain fertility by soil management and fertilisation. The result of this policy, however, is that large areas of originally fertile land now lie derelict and much of it beyond any hope of redemption.

Soil erosion is not confined to tropical Latin America: it occurs in the temperate regions. In Chile, for instance, according to G. J. Butland, "Experts estimate that 10 million acres have been affected by erosion, the worst areas being the coastal zone of Mediterranean and north forest Chile from San Antonio to Valdivia, and the Arauco-Temuco zone where fires to clear new land have led to the destruction of valuable forests and the protective soil covering."* Although soil erosion has not yet reached serious dimensions in Argentina and Uruguay, "there are ominous reports that a 'dust bowl' from the arid west is spreading eastwards into the productive country."† Fig. 20 shows the areas in Latin America which have suffered soil erosion.

* *Chile*. London: Royal Institute of International Affairs. 1951. P. 72.

† RUSSELL, SIR JOHN. *World Population and World Food Supplies*. Allen and Unwin. 1954. P. 455.

Chapter II

THE HUMAN BACKGROUND

RACIAL COMPOSITION

THE population of Latin America is racially very mixed, and this diversity of racial make-up is one of the characterising features of the region. Racial mixture has been widely carried on for over four centuries, and out of a total population of some 200 millions more than half are of mixed stock. Three chief racial ingredients have gone into the composition of the Latin American peoples. Indian, European, and African components are apparent in the racial make-up.

The chief questions which arise are: To what extent has intermixture taken place? How do the different ethnological types get along together? Is miscegenation and racial blending a happy and beneficent development? Before attempting to answer these questions let us briefly estimate the importance and significance of the three chief racial groups in the Latin American ethnological picture.

THE INDIAN ELEMENT

The indigenous inhabitants of America were the Indians who, originally, in the remote past, came from Asia via the Bering Strait and filtered southwards. The total Indian population of the Americas at the time of the Columbian discovery is uncertain, but in all probability did not exceed more than a few millions. The conquest of America took a terrible toll of the aboriginal population, especially in the Indies. This toll was exacted not merely by conquest but by the ensuing "enslavement" of the Indians, the barbarity of the early conquerors, and the ravages of introduced diseases. The net result was that the Indian populations in the West Indian islands were almost completely eliminated, and to this day Indians in this region form a very small minority group.

On the mainland, in Central and South America, the Indians fared much better. Though the Indians suffered and, in the beginning, sustained heavy losses through opposition to the Conquistadores, they were essential to the Spaniards and the colonial economic system which they established. The indigenous population was needed to supply the labour force for work in mine, plantation, and field. Moreover, as Professor Robin Humphreys has remarked: "if the Spaniard exploited the Indian, he also tried to save his soul." This meant, in effect, that the Indians' welfare was often a matter of considerable concern to the colonial government. And it helps to explain, in part, the survival of the Indian peoples. Contrast the

situation in North America, where the Protestant colonists had no compunction about exterminating the North American Indians.

There is virtually no country in Latin America, certainly none in South America, which does not possess some Indian element. The element varies widely, however: in Ecuador perhaps nearly 75% of the people are pure Indian; in Guatemala the percentage of pure-bred population is 55; in Costa Rica it is 10%; while in Uruguay, which is almost completely white, there is scarcely a trace of pure Indian blood. Generally speaking, the Indian element is strongest in the countries of the Central American mainland and the Andean states; weakest in the temperate zone countries of South America; and altogether absent, or nearly so, in the West Indies. Except, perhaps, in some of the islands of the Caribbean, there is, however, some proportion of Indian blood in every Latin American country.

THE EUROPEAN ELEMENT

With the discovery of the New World at the end of the fifteenth century, Europeans began to invade the Americas. During the ensuing two centuries most of the immigrants came from Spain and Portugal, the two great colonial powers of Central and South America. Europeans, other than Iberians, were legally excluded from Latin America, though Dutch, English, Danish, Swedish, and French sought colonial footholds. In eastern South America, where Portuguese authority was legalised, the bulk of the immigrants were Portuguese. Elsewhere, they were preponderantly Spanish.

With the disintegration of the Spanish colonial empire at the beginning of the nineteenth century and the setting up of colonial independence, large numbers of immigrants from almost every European country sought liberty and refuge in Latin America. Between 1848, the year of revolutions and persecutions in Europe, and 1931, the year when unrestricted immigration was stopped and the quota system established, something like 20 million people sought settlement in Latin America. The steady trickle of immigrants in the early part of last century developed into a flowing stream when the Italian movement got under way. In the "ABC" countries (*i.e.* Argentina, Brazil, and Chile) considerable proportions of British and German stock are to be found along with the Italian. Later immigrants, notably peoples of British and German and Oriental origin (Syrians, Chinese, and Japanese), have not always become completely assimilated and tend to form distinctive colonies. Southern Europeans are much more resilient and do not resist absorption: they become Americanised fairly easily.

In temperate South America, particularly Argentina, Uruguay, and central Chile, the population is largely dominated by white stock, since the early settlers largely exterminated the native inhabitants, who were few in numbers, and people who are Spanish or Italian or of Spanish and Italian ancestry bulk large, though Patagonia has been settled mainly by

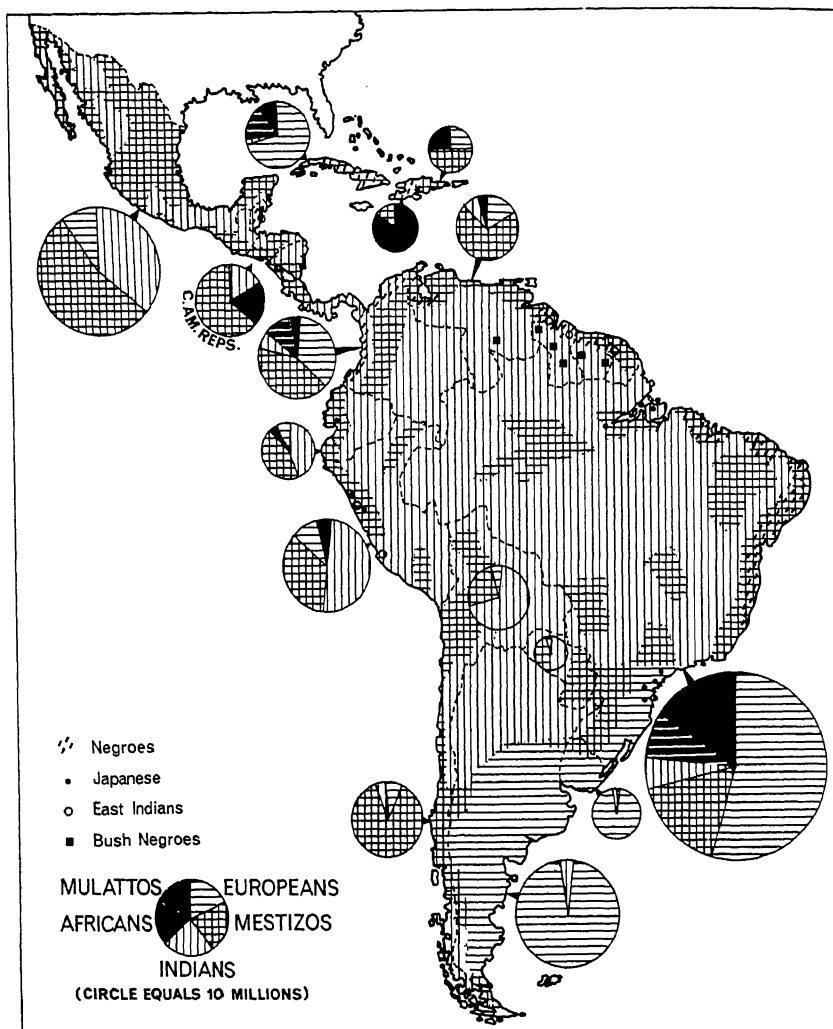


FIG. 21.—Distribution of races in Latin America.

people of British origin. Persons of European stock are known as *criollos*. In the Andean and Central American countries (Costa Rica excepted) white peoples are very much in a minority.

THE AFRICAN ELEMENT

The third ethnic component in Latin America is the Negro. African in origin, this third major strain in the racial composition of the region owes its presence to the institution of slavery. The Portuguese found the Indians lazy and loth to work for them and, in order to man their plantations, were obliged to import Negro slaves from Africa; it has been

estimated that some 12 millions were shipped to Brazil! Similarly in the Caribbean islands and coastlands, where the native Indians refused to, or died from, work in the mines and plantations or were decimated by European diseases, large numbers of black people were brought in. An interesting point in connection with this matter is that whereas the enslavement of the native Indian peoples was not normally undertaken—indeed there were specific rules against any such action—there were no scruples where the African was concerned.

The areas in Latin America where the Negro element is strongest are the West Indies, the coastal regions of the Caribbean, the Pacific margins of northern South America and north-eastern Brazil, *i.e.* the hot, wet regions where tropical plantation agriculture was carried on by the early Spanish and Portuguese colonists. These were not the only areas where the Negro was present, for at some time in the past African slaves were to be found almost everywhere, though usually in smaller numbers. In areas such as the Plate region, Chile, Peru, and Cuba the Negro strain has become absorbed or is rapidly becoming absorbed and is not distinguishable as a separate component of the population. The Negro element in Latin America is of the order of some 25 millions. The most numerous concentrations are in Brazil (10 millions), Haiti (3 millions), and Colombia (about 750,000), but in all these countries, in addition to the pure Negro element, large numbers of the population have an admixture of Negro blood. The Negro element is most pervasive in the Caribbean islands; indeed, it is dominant in all the islands excepting Puerto Rico, the Dominican Republic, and Cuba, and even in these countries African blood has left an indelible mark.

LATIN AMERICAN MELTING POT

Anthropologically the most interesting and intriguing thing in Latin America is not the numbers of Indians or Europeans or Negroes but the amount of racial intermixture which has occurred. Miscegenation has been widely carried on for a prolonged period, and more than half of the total population is of mixed stock. Inter-breeding among the three chief racial groups has given rise to certain hybrid types, *viz.* *mestizos*, who are of mixed white and Indian blood, *mulattos*, who are of mixed European and African blood, and *zambos*, of Indian and Negro blood. These mixed breeds, in turn, interbred, with the result that racial intermixing has gone on in Latin America on an unprecedented scale. The region is, indeed, a great melting pot of races. In due course a new racial "type" is likely to emerge from this large-scale mongrelisation.

Why and how did this racial intermixing come about? In the first instance, the Spanish and Portuguese adventurers came to the Americas without their womenfolk and, needing solace as men do everywhere, took as mistresses the native women of the lands they occupied. Thus, from the very beginning, Europeans fraternised with the Indian populations. Secondly, the Roman Catholic Church recognises no colour bar,

hence the early Portuguese, and Spaniards too, brought a broad and tolerant outlook with them and intermarried freely with the Indians, an attitude which has assisted racial assimilation. This is in direct contrast to the attitude of most modern European nations, who in their colonising activities have upheld the colour bar.

Most of the Latin American countries possess a considerable proportion of mixed types; some have predominantly mixed populations. Brazil, in particular, is a country of mixed peoples. Chile is a land with a long-established and long-stabilised mestizo population. Mexico, Venezuela, Colombia, Paraguay, and Peru are mainly mestizo countries. In most of the Andean states Indians and mestizos make up 75% and over of the population.

RACIAL PROBLEMS

Latin America forms a great biological experiment. Here racial intermixture is proceeding on a scale hitherto unknown, and the question of racial assimilation will be watched with interest. As already indicated, the region may well produce a new and distinctive racial type in the future.

Until very recently the pure-blooded Indians have not shown any tendency to expand, and at one time it was thought that they might disappear completely. But now, except in Argentina and Uruguay, where they were always few in numbers, there is a strong indication that they are on the increase. The Negro elements generally exhibit a fairly high rate of increase notwithstanding a high infant mortality rate. The white peoples, too, are maintaining a rate of increase sufficiently high to support the expansion of settlement. But, after all, the mestizo, who is already the most numerous, will undoubtedly become the predominant racial type and may be the best hope for Latin America. It has been claimed that mixed breeds inherit the worst features of the races concerned, but, measured by standards of equality of opportunity and education, this still has to be proved. It is an argument advocated by racial purists. In the high Andean region at any rate the mestizo type compares very favourably with the pure-blooded Indian.

In those countries where a varied racial composition is characteristic a certain social pattern is evident: the land-owning and governing classes are white, the professional and business groups white and mestizo, and the labouring, whether peasant or artisan, class mestizo, Indian, and Negro. This is a generalisation, of course, and there are frequent exceptions to the rule. In most of these multi-racial countries the segregation which takes place stems rather from social than from racial factors. In Brazil, for instance, the relative absence of a colour bar is a very noteworthy feature; what cleavage there is, and it would be idle to pretend that one does not exist, is social rather than racial. The racial antagonisms which divide South Africa, another land of similar multi-racial ingredients, do not exist in Latin America.

Summing up, it is probably fair to say that racial intermixing is pro-

ceeding comparatively happily and successfully, and unless racism is artificially stimulated, the peoples of Latin America will ultimately lose their varying identities and become integrated into one blended type. Assimilation has already gone far: it is to be hoped nothing will interfere with its consummation. Health, education, and opportunity are the things of fundamental importance to humanity, not skin colour, hair type, or any other physical trait.

POPULATION

ECONOMIC ASPECTS OF THE POPULATION PROBLEM

The size of a country's population is of economic importance for two main reasons: (i) the factor of production depends very much upon the amount, availability, and quality of human labour, and the supply of this labour is itself closely related to the number, age composition, and education of the population; (ii) people are consumers as well as producers, and the standard of living bears a close relationship to the numbers sharing the national income, that is, the total of goods and services produced by the economically active population.

Also of great importance is the size of a country's population in relation to other factors of production, such as the natural resources, physical handicaps, availability of capital, etc. The total economic output of a country will fall short of what it might be if there is insufficient manpower to make full and effective use of the non-human factors of production. On the other hand, if the population is too large in proportion to the non-human factors of production, then living standards, accordingly, will be much lower than they might be had a better balance between the two groups of factors obtained. Theoretically, there is an optimum population for every country: this optimum population is reached when the labour force is just sufficient to make the best possible use of the available resources. But this fine balance is not necessarily constant: any increase in resources—an improvement in soil fertility, new mineral finds, realisation of power potential, stock of capital—will probably permit or require increased supplies of labour; it follows, therefore, that the level of the optimum population will be raised.

Over-population does not depend merely upon the total number living in a country nor upon the density of the population. For example, a population density of 60 persons to the square mile may mean over-population in one area but in another under-population. Much indeed depends upon the available resources and the degree of cultural development. Moreover, a country is not necessarily over-populated simply because it is incapable of providing sufficient food to support its people—a situation which we shall find obtains in Venezuela, although its population is small and there is no shortage of cultivable land; a country may be able, as in the case of Britain, to employ its labour force more effectively

in manufacturing industry, exporting its manufactured goods in exchange for foodstuffs.

Conditions vary widely in Latin America. Some countries or areas are over-populated, others under-populated: in the first category fall the islands of Barbados and Puerto Rico and the republics of Haiti and El Salvador; in the second such countries as Paraguay and Nicaragua and the Guiana colonies. Most of the Latin American countries are, in fact, under-populated in the sense that there is room enough and sufficient potential resources to support much larger populations. Brazil, indeed, has realised that her population must be increased if she is to populate and effectively open up her extensive territories.

There are several other aspects of the population problem. In addition to the problem of numbers in relation to food supplies or the other factors of production, there are such questions, often of major national importance, as the rate of population growth or decline, the distribution between the various age groups, the balance between rural and urban population, the proportion of males to females, and the degree to which the population is literate and educated. All these things in their different ways affect the standard of living of a people.

POPULATION GROWTH IN LATIN AMERICA

Until fairly recently Latin America, and more especially the tropical portion, showed a comparatively slow increase in population growth. Two factors may be noted which help to explain this slow expansion: first, a high death-rate, even though the birth-rate was probably high, among the Indians and Negroes and, second, the unhealthiness of the tropical lowland areas with their fevers and diseases. Table II gives some indication of the slow increase which typified the region in the past.

TABLE II
Growth of World Population by Continents (millions)

| <i>Continent</i> | 1650 | 1750 | 1850 | 1900 | 1950 | 1960 |
|---------------------------------|------|------|------|------|-------|-------|
| Central and South America . . . | 12 | 11.1 | 33 | 63 | 160 | 200 |
| North America . . . | 1 | 1.3 | 26 | 81 | 166 | 190.5 |
| Europe | 100 | 140 | 266 | 401 | 587 | 588 |
| Asia | 330 | 479 | 749 | 937 | 1,270 | 1,556 |
| Africa | 100 | 95 | 95 | 120 | 198 | 225 |
| Australasia | 2 | 2 | 2 | 6 | 13 | 15.4 |

During recent decades, however, the demographic situation has altered materially. The former slow rate of growth has become so accelerated that Latin America now has the highest rate of increase of any region in the world. Between 1920 and 1940 the population increased at the rate of 1.73% a year, compared with the world rate of approximately 1.0%. Between 1940 and 1950 the rate of increase for Latin America was 2.3%, as compared with a world average increase of 1.2%, the increases vary-

ing between 0.8 and 1.5%. At the present day the Latin American rate of increase stands at 2.5%. In certain countries the rate is considerably higher than this average figure; for example, in Mexico the population is growing at the rate of 3.5% a year—one of the highest figures in the world.

According to D. Kirk, a demographic specialist, the birth-rate in Latin America about 1930 was approximately 40 per thousand with a death-rate of 24 per thousand, giving an excess of births over deaths of 16 per thousand. During the decade 1940–50 the birth-rate continued at 40 per thousand, but the death-rate fell to 17 per thousand, thus the net increase stood at 23 per thousand. It seems likely that the birth-rate will continue at around 40 per thousand, or perhaps even increase slightly, for some time to come. On the other hand, the death-rate will continue to decline. The population increase in Latin America is due to many factors, of which immigration is one not to be neglected, but improved and increased medical services, better hygiene and sanitation, and the control

TABLE III
Countries: Population (1965–66)

| <i>Country</i> | <i>Area</i> | <i>Population</i> | <i>Average density per square mile</i> |
|-----------------------------|-------------|-------------------|--|
| Mexico | 758,000 | 44,145,000 | 51 |
| Central America | | | |
| British Honduras | 8,867 | 109,000 | 12 |
| Guatemala | 42,042 | 4,438,000 | 106 |
| El Salvador | 8,259 | 2,928,000 | 354 |
| Honduras | 43,277 | 2,363,000 | 54 |
| Nicaragua | 57,143 | 1,685,000 | 29 |
| Costa Rica | 19,652 | 1,484,000 | 76 |
| Panamá | 31,900 | 1,287,000 | 40 |
| West Indies | | | |
| Cuba | 44,218 | 7,833,000 | 177 |
| Haiti | 10,500 | 4,485,000 | 427 |
| Dominican Republic | 19,300 | 3,750,000 | 194 |
| Puerto Rico | 3,400 | 2,669,000 | 785 |
| Jamaica | 4,400 | 1,843,000 | 419 |
| Trinidad and Tobago | 1,864 | 975,000 | 523 |
| Colombia | 495,519 | 18,068,000 | 36 |
| Venezuela | 352,143 | 9,030,000 | 26 |
| Ecuador | 106,508 | 5,238,000 | 49 |
| Peru | 531,000 | 12,012,000 | 23 |
| Bolivia | 415,000 | 3,748,000 | 9 |
| Chile | 290,000 | 8,567,560 | 30 |
| Argentina | 1,072,745 | 22,691,000 | 21 |
| Uruguay | 72,172 | 2,749,000 | 38 |
| Paraguay | 157,047 | 2,094,000 | 13 |
| Brazil | 3,289,000 | 84,679,000 | 26 |
| Guyana | 83,000 | 647,000 | 8 |
| French Guiana | 35,135 | 36,000 | 1 |
| Dutch Guiana | 54,000 | 324,000 | 6 |

of many diseases have all played a very significant part. Infant mortality rates are still frequently distressingly high, some diseases remain a serious menace, and there is much room for improvement in uncontaminated water supplies and sanitary arrangements. But conditions generally are steadily improving.

The total population of Latin America is more than 200 millions. Of these some 85 millions live in Middle America, some 66 millions in Brazil and about 35 millions in the temperate countries of Argentina, Chile, and Uruguay. Preston James has estimated that the population of Latin America will reach 593 millions in A.D. 2000, an increase of just about 300% in less than half a century.* Such rapid growth will bring many problems. Above all, it will necessitate a tremendous expansion in productivity if the present increasing standards of living are to be maintained, much less improved upon.

THE DISTRIBUTION PATTERN

Population distribution and density vary widely from place to place. Study of a population map reveals several notable features in the pattern of settlement; these are: (i) a distinctly peripheral distribution as a whole; (ii) a definite tendency for the population to congregate in clusters; (iii) an interiorwards penetration mainly along river lines; and (iv) the sparse population of vast inland areas. This pattern is the outcome of historical, physical, and economic factors.

Certain physical conditions, such as cold, aridity, swamp, steep slopes, poor soils, remoteness, and inaccessibility, which influence population distribution anywhere, have affected population densities in Latin America. In the hot, moist tropical lowland areas the prevalence of disease and fever has also doubtlessly militated against settlement and the growth of population. On the other hand, certain favourable physical conditions have attracted settlement and fostered population growth, *e.g.* the cool highlands in the tropical zone, the volcanic soils of the Central American highlands, the mineral wealth of the central Andes, the level, fertile, humid plains of the pampas, and the life-giving Andean streams which water the Atacama-Peruvian desert.

The bulk of the people of Latin America live close to the coast; the principal exceptions are in Mexico, where the fertile soils and cooler conditions of the southern portion of the Mexican Plateau have acted as a magnet to settlement, and in the north-west of South America, where the tropical heat of the coastlands has caused man to settle the more salubrious highlands. Until quite recently virtually all the effective settlement was within some 300 miles of the coast. The Spanish and Portuguese conquerors and colonists were few in numbers and were incapable of effectively occupying the whole region. It was natural that they should occupy the more accessible and more favoured areas; these happened to be coastal and near-coastal regions. Granted, the Spaniards and Portuguese claimed

* *Latin America*. P. 864.

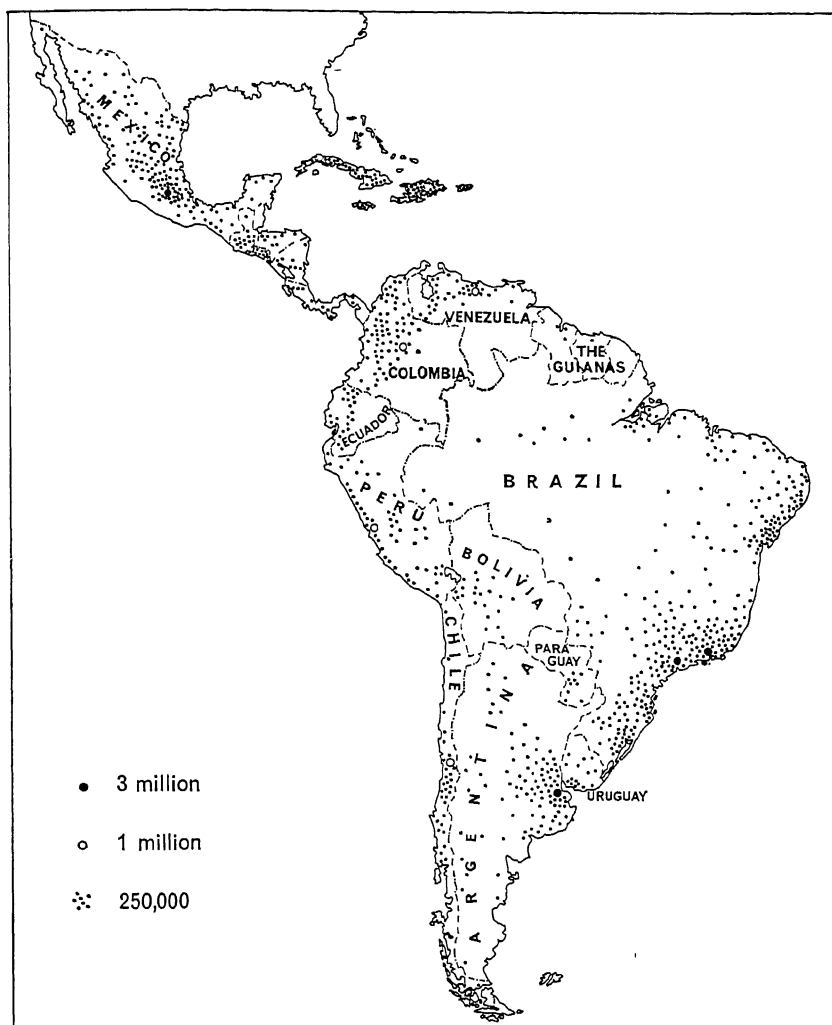


FIG. 22.—Distribution of population in Latin America.

sovereignty over extensive areas, but their hold on such areas was nominal rather than actual.

This coastal concentration, and its corollary, a thinly peopled interior, remain characteristic to the present day, although since the end of the Second World War the first definite signs of effective penetration and occupation of the interior are beginning to manifest themselves. Amazonia, the savanna lands and Patagonia, however, are still very sparsely populated; settlement, where it has occurred, is chiefly along river lines, since the streams offered the only easy, sometimes the only practicable, means of ingress.

One of the most interesting and significant features of the distribution pattern is the dispersed clusters of population. Areas of more or less dense rural population with a focusing city, often of disproportionate size for the area it serves, surrounded by almost empty land are a distinctive feature. Though this pattern is not unique to Latin America, occurring also in Australia and to a lesser extent in South Africa, it is especially well developed there. This clustering is very marked in Brazil and has arisen out of the separate phases of its economic development which occurred in different regions. The isolation of cluster from cluster has in the past militated against national cohesion, but with improved communications and transport, especially radio and air travel, the effects of this clustering have been modified.

Another notable feature is the concentration of population in the inter-tropical zone in the highlands. The intermontane basins and plateaus of the Andes and the Central American Cordillera, rather than the adjacent lowlands, are the principal seats of population. The southern part of the Mexican Plateau and the south-eastern portion of the Brazilian Plateau are, also, respectively, the most densely peopled areas in the two countries. This is mainly a response to the cooler, more healthful conditions characterising the highlands.

In spite of the recent rapid growth of population, it should be appreciated that Latin America, on the whole, is, and is likely to be for a long time, one of the most sparsely peopled regions of the world. Locally, of course, there are high densities as, for example, in Barbados, where the density reaches a level of about 1500 persons to the square mile, and in El Salvador, which has 354 to the square mile, but in general densities are not great and there are relatively few rural areas which can show a density greater than 120 to the square mile. The overall density is between 10 and 12 to the square mile, and even the population clusters usually have rural densities of less than 100 (*see Table III*).

SOCIAL ASPECTS

Many aspects of social life in Latin America are of great interest. Not all of these, however, have geographical implications, neither have they any close relationship to environmental conditions; hence here we are concerned only with those aspects of social life which are geographically significant.

LANGUAGE AND RELIGION

Both the dominant languages, Spanish and Portuguese, and the dominant religion, Roman Catholicism, are importations from Europe, from Latin or Mediterranean Europe, and these two culture traits help, as we have already noted, to distinguish Latin America as a major world region. With the major exception of Brazil, where Portuguese is the official language, Spanish predominates generally throughout Latin America.

There are one or two exceptions to this general rule: the Haitians speak a debased form of French, a result of the former French occupation of Haiti; British possessions have English as the official language, and the peoples commonly speak English or are bilingual; while in British, Dutch, and French Guiana the languages are respectively English, Dutch, and French.

Although in most countries Portuguese and Spanish are the official languages, there is often one or more Indian tongue spoken where native Indian peoples form a notable component in the population. The variety of Indian languages is as great as that found elsewhere in the world. The differences between the various Indian tongues, even very often between those spoken by adjacent tribes, are wide. The Indian languages appear to form a quite distinctive linguistic group, for there is no known relationship between any of the Amerindian tongues and those elsewhere in the world. The absence of any linguistic affiliations "suggests both a respectable antiquity for the American Indian and a long period during which there was no important immigration from the Old World."*

In Latin America there are well over 100 million adherents of the Roman Catholic Church. Such allegiance is not confined to recent European immigrants nor to the descendants of earlier European immigrants: many millions of Indians and Negroes also profess the Faith. Catholic missionaries, especially the Society of Jesus, first brought Christianity to the Americas. The Counter-Reformation of the latter part of the sixteenth century had invigorated the Catholic Church and its missionaries, fired with renewed zeal, laboured in the West as well as the East. Large-scale conversion of the Indians took place.

The role played by the Catholic Church in Latin America has come in for a good deal of criticism, but in the early days at least it was responsible for much good work: for example, it condemned the extermination of the Indians and sought to mitigate the horrors of slavery; it campaigned with success against the brutal native religions which involved human sacrifices; it was responsible for the first schools and the initial attempts to educate the Indians; it was responsible, through the efforts of its religious orders, Benedictines, Franciscans, and Carmelites, for colonising many remote and inaccessible areas; and it built, with the help of Indian labour, the hundreds of exquisite churches which adorn Latin America.

Unfortunately the Roman Church, partly because of its immense influence, became corrupt and worldly. In some countries, as in Mexico, for example, it became a large landholder and developed commercial interests. Material possessions gave the Church a stake in the established order, and it supported such types of government as were predisposed to promote its interests. Thus it opposed the movements for freedom and independence and has even striven to withhold intellectual enlightenment and begrudged social improvements. It is not surprising, therefore, that

* RUSSELL, R. J., and KNIFFEN, F. B. *Culture Worlds*. Macmillan & Co. 1951. P. 532.

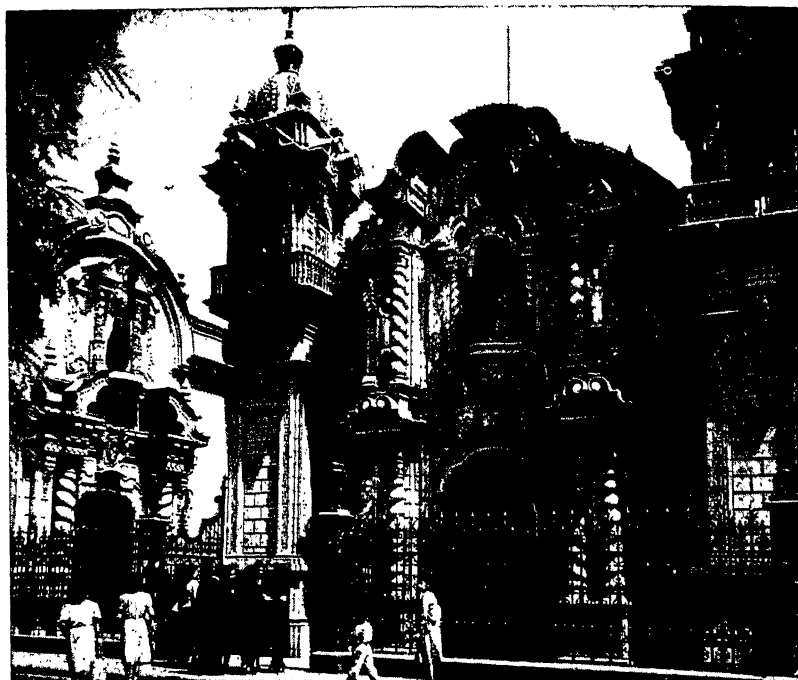


FIG. 23.—Church of San Marcello, Lima. Built by the Spaniards, the façade of this church illustrates in an excellent manner the rococo style of Spanish ecclesiastical architecture, examples of which are to be found in every country in Latin America.

in most of the republics the Church has been disestablished and in some states its property expropriated. Although the Roman Church is almost completely devoid of constitutional rights and no longer exercises any political influence of any consequence, yet it is commonly recognised by the various governments as the unofficial Church of the people, and its influence in many other ways is still deeply rooted.

THE FAMILY

Generally speaking, the social structure is similar throughout Latin America. There are two aspects of this social structure worth emphasising: the social stratification and the family unit.

The first has already been alluded to: there exists a small, wealthy minority—in the past the landed and ruling class—and a large, poverty-stricken majority. In some countries a middle class is emerging, but it remains, as yet, relatively small. Racial prejudice and discrimination does not exist in Latin America in the form which prevails in other parts of the world and race does not present an insuperable barrier to increased social status. In the region generally public opinion puts a much greater significance on social symbols, *e.g.* the ability to speak Spanish, education, bour-

geois background, etc., than on racial physical traits. For example, the native Indian has only to leave his village community, discard his traditional costume, and learn Spanish to be accepted as a mestizo.

The second aspect relates to family life. A broad distinction can be made between those who are lawfully married, *i.e.* married by civil authority or through the Church, and those who are not legally married. Informal marital arrangements are common throughout most of Latin America, and large numbers of babies—perhaps as many as half in some areas, probably over 70% in Jamaica—are born illegitimate: not that this matters very much, for there is little distinction and almost no social stigma between those born in or out of wedlock. The law makes no distinction. According to the Mexican census of 1940, in which four types of union were listed—marriage by civil authority, marriage by both civil and religious ceremony, marriage through the Church (not, by itself, legal under Mexican law), and free union—slightly less than two-thirds of the population were legally married and approximately a quarter were living as man and wife in free union.*

This practice of cohabiting is very largely a matter of economics; a young couple may not be able to afford the marriage fee, hence formal sanction is ignored in the beginning; later, perhaps, when they have saved some money, the union will be formalised by the judge and blessed by the priest. Of all the ethnic groups, the Negroes pay least attention to the legality of marriage. Free union has one very important result: it encourages early, and often regular, childbearing, and so helps to explain the rapid growth in population numbers.

While in temperate South America and among peoples of recent European extraction the family structure approximates to that as we know it, elsewhere there are significant differences. Professor T. S. Simey, who has been closely concerned with social questions in the West Indies, has indicated that the same fundamental pattern of living is readily discernible throughout the West Indian region.† He has distinguished two types of family: the first revolves around the female, a “granny” who lives with her daughters and their children plus perhaps additional “acquired” children; the second centres on the male, who is head of the family, the woman being very much in the position of a “keeper” who can be turned out of the house at the master’s whim. The first type is found more usually in the towns and villages, the second among the peasant cultivators.

In the West Indies and elsewhere there is often a looseness in family life and the family structure which creates serious social problems. The inferior position of womenfolk is gradually being changed and the equality of the sexes is slowly gaining ground; such changes are bound to affect family life and will probably affect it for the good.

* FRASER, SIR RONALD. *Latin America*. Hutchinson. 1953. P. 133.

† “The Welfare of the West Indies.” *Geographical Magazine*, vol. XVIII, no. 7. 1945. Pp. 293–301.

ILLITERACY

One of the big problems of Latin America is the problem of illiteracy. Accurate statistics of literacy are not easy to procure; the countries with the lowest literacy rates are naturally those where the least comprehensive, thorough, and accurate surveys can be made; again, in some countries the figures may be out of date by as much as a decade, a fact of much significance in view of the recent drive towards literacy in many countries. Moreover, definitions of what constitutes illiteracy vary appreciably: to some it signifies a complete inability to read and write, to others it implies a mere lack of facility in reading and writing; accordingly, some countries distinguish between illiteracy and semi-literacy. The position is complicated further in Latin America by the fact that some Indian languages have no written form.

Fig. 24 is an attempt to show the distribution of illiteracy in Latin America. It will be observed that the highest literacy rates occur mainly in the temperate countries of Argentina and Uruguay, that is, in those countries whose populations are of predominantly European extraction. It is significant, too, that of all the Central American Republics Costa Rica, which has a predominantly white population, is the only one with a high literacy rate. Illiteracy is highest among the more purely Indian populations, especially in Bolivia, but is characteristic of all countries with a strong Indian element in the population.

The problem of illiteracy depends partly on social, partly on economic, and partly on geographical conditions.* The problem is related in part to widely varying social conditions, sometimes aggravated by the fact that the native Indian peoples continue to live much as they did in pre-conquest days. As mentioned above, the need for a written language has never materialised among some groups. Secondly, the problem is sometimes linked with purely economic conditions; in some countries the national income is low and does not allow of free elementary education for all. Education is notoriously costly and in Bolivia, where free, compulsory education up to the age of seventeen has been introduced recently, it is swallowing up 45% of the national budget. Thirdly, there are difficulties connected with purely geographical conditions: isolation, inaccessibility, and the scattered nature of the population make the provision of education, however desirable it may be, almost or quite impossible; physically the nearest, and perhaps the only feasible, solution would be the institution of a system of travelling schools.

It is important to realise that illiteracy is not necessarily an indication of low intelligence; neither does literacy of itself bring social advancement and material improvement. This is proved by the fact that illiterate communities have evolved quite elaborate cultures. But there is obviously a limit to such cultural developments when literacy is absent, for literacy does provide the basis for material progress and all it implies—scientific

* SARMIENTO, E. "Latin America." *Bureau of Current Affairs*, no. 119, November 1950.

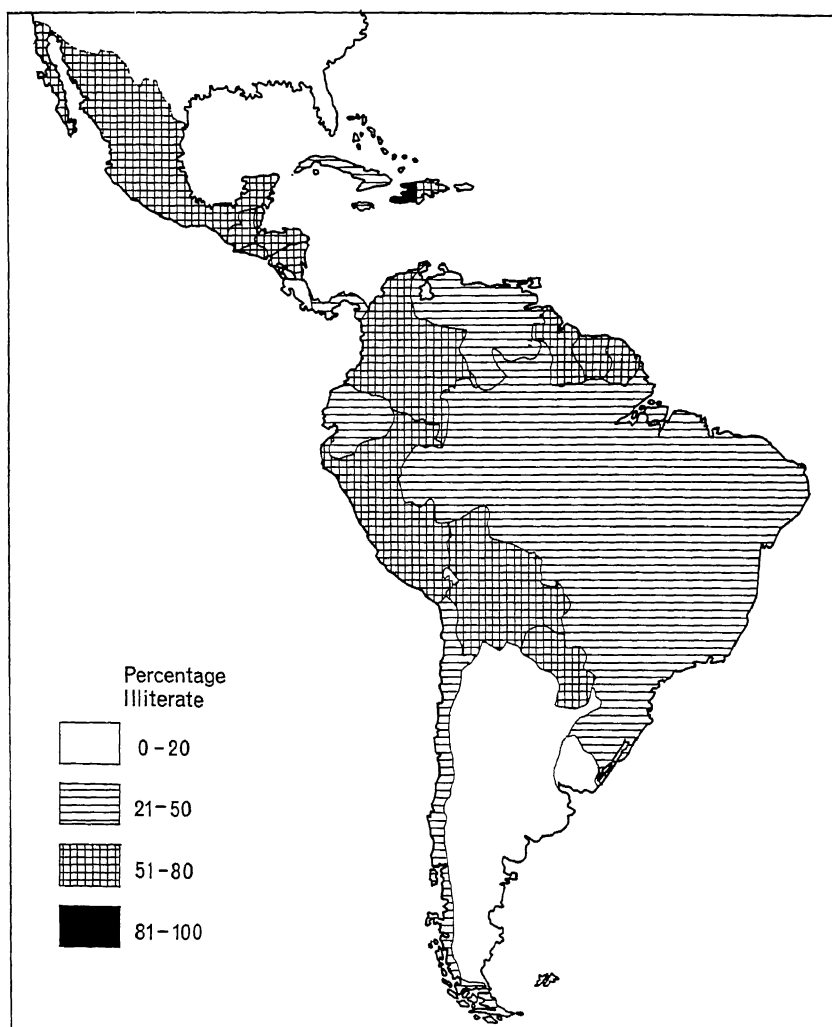


FIG. 24.—Illiteracy in Latin America.

and technical advances, improved hygiene and health, social betterment, etc. Education is the best antidote to the belief in magic, social inequality, and the dead hand of tradition. Because literacy and education are vital factors in national progress, most governments are making strenuous efforts to reduce illiteracy, *e.g.* Brazil and Bolivia, and help from such organisations as Unesco is welcomed.

HEALTH, HYGIENE, AND FOOD

Disease and health, hygiene and sanitation, food and malnutrition, all inter-related aspects of social welfare, present acute problems in most

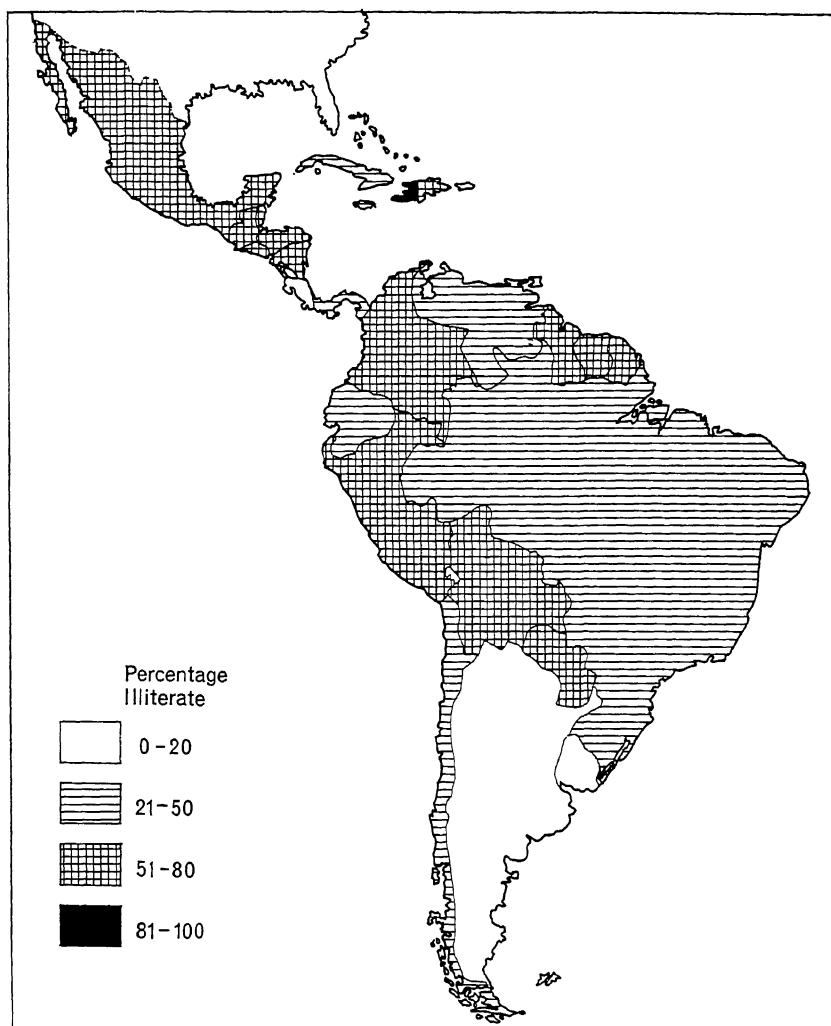


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HEALTH, HYGIENE, AND FOOD

Disease and health, hygiene and sanitation, food and malnutrition, all inter-related aspects of social welfare, present acute problems in most

Latin American countries. It is instructive to compare maps illustrating the degree of illiteracy, infant mortality, and near starvation: they show some remarkable similarities. A number of questions naturally pose themselves: are these similarities a coincidence? are such conditions as a high infant mortality rate and near starvation found with, and linked to, illiteracy? It should not be thought that illiteracy necessarily causes these other conditions; on the other hand, it is undeniable that literacy would help to wipe them out.

In no country in Latin America is the expectation of life at birth greater than about 50 years; indeed, in some countries it is a good deal less, as much as 10 years less. This is principally due to the high rate of incidence of disease. The tropical climates, characteristic of much of the region, add tropical diseases to those found in temperate lands, but the plague of diseases is due very largely to the widespread lack of sanitation, the scant attention paid to even elementary hygienic precautions, and polluted water supplies. Such simple safeguards as the use of the toilet, frequent washing and bathing, the wearing of shoes, the boiling of water, etc., are seldom undertaken outside the towns, sometimes not even in the towns. As a result, many diseases are prevalent, *e.g.* malaria, typhoid, tuberculosis, yaws, smallpox, hookworm.

Fraser says that twelve distressing diseases are prevalent in the town of Huancayo in Peru.* Galbraith quotes an annual rate of over 1000 cases of typhoid in Medellín in Colombia.† These are random examples, but they give some idea of the seriousness of the problem. Some diseases have been reduced, *e.g.* leprosy, or practically eliminated, *e.g.* yellow fever, while malaria has been stamped out or at least brought under control in some areas, *e.g.* Panamá. Three principal problems face responsible authority with respect to the medical problem: (i) the general lack of trained doctors, nurses, and other personnel concerned with health; (ii) the often acute shortage of hospitals, clinics, and medical equipment; and (iii) the difficulty of overcoming tradition, superstition, and ignorance. Many governments are tackling this health and hygiene problem with commendable vigour, *e.g.* Brazil, the Dominican Republic, but a tremendous task still confronts all governments, and only in Argentina, Uruguay, and Chile may the situation be said to be satisfactory.

The general debilitation of many groups of people and some afflictions, *e.g.* worm infestation, are the result of inadequate or unsound diet. Under-nutrition and malnutrition are common in the tropical countries. Over half of the population has an intake of less than 2200 calories (in Britain 2800 calories is looked upon as being necessary to maintain full bodily health and vigour), and probably half of these have less than 2000 calories a day. When crop failures occur, under-nutrition passes very easily into semi-starvation. However, malnutrition may occur even when people are getting an adequate amount of food, for the diet may be lacking in

* *Latin America*. P. 120.

† *Colombia*. Royal Institute of International Affairs. 1953. P. 29.

variety and deficient in one of the three main constituents—proteins, carbohydrates, and fats—that are necessary for physical health and constitute the balanced diet. The habit of chewing coca, which is very common in the Andean republics, and the practice of geophagy, or the eating of earth, may well be a response to sheer hunger or to specific hunger, *i.e.* a deficiency in certain chemical constituents which the body requires.

Poverty, individual and national, is largely responsible for the problem of ill-health. Individual poverty means inadequate food and bad housing, national poverty means lack of sewage systems, deficient public water supplies, and inadequate medical services. Much remains to be done to promote better health and hygiene.

HOUSING

There exists in Latin America every kind of dwelling from the flimsiest of structures to ultra-modern flats, but most of the rural population live in simple, rude houses, while the majority of the urban population dwell in cramped, dilapidated quarters.

Rural dwellings are broadly of two types: flimsy shelters built of bamboo, cane, or timber with roofs of straw thatch, bark, or even large leaves and mud-brick or stone houses roofed with thatch or occasionally corrugated sheeting. In general, house types show an adaptation to environmental conditions and are built of whatever local materials are available.



[Courtesy: C. and M. Haywood.]

FIG. 25.—Primitive thatch huts in the tropical forest.

The first type, which is common to the hot, wet forested lowlands, is frequently built on stilts or raised off the ground to avoid excess damp and insect pests. It is usually an open structure in the sense that it has neither windows nor doors. One side of the hut may be wall-less. There is often a veranda of sorts. Such dwellings usually consist of a single room where the family congregates primarily for shelter from the rain and for sleeping purposes. In the West Indies rural dwellers herd together in small wooden

huts or in hovels made out of plaited cane, cardboard sheeting, flattened petrol tins, or anything that will serve as building material.

More substantial are the second type, the adobe-plaster or stone-built houses characteristic of the Mexican Plateau and the Andean Highlands. These are usually solidly built with earthen floors and roofs sometimes of tile, but usually heavily thatched. Here, again, there is frequently only one room in which all domestic activities take place. There is normally no illumination, other than candle-light, no running water for washing or cooking, no inside lavatories, and no sewage-disposal systems.

Fraser has described the typical conditions under which the Andean Indian lives: "his home is a shelter with mud or stone walls and peaked roof thatched with grass or straw and surmounted by a crucifix. Cosy perhaps, although without windows or smoke vents and the earth floor is usually littered with filth, gnawed bones, dried sheep-droppings or cow-dung, chicken, rabbit or guinea-pig droppings, scraps of food, broken utensils, bits of clothing, and dirty bedding. Blankets, tools, corn, red peppers, and other dried grains or vegetables hang from pegs in wall or rafters. Some prepare their food here, but more often there is a small kitchen adjacent. There is usually a corral in which the animals are herded at night. Manure, straw, food and trash are kicked all over the



[Courtesy: Bolivian Embassy.]

FIG. 26.—An Andean Sierra village. Note the compact nature of the settlement, the single-storeyed dwellings, with their thatch roofs and almost total absence of windows, and the yards or compounds attached to each house.

courtyard and into the huts by chickens, dogs, rabbits, and children. Field or courtyard serves as latrine. Jacket, shirt, trousers, petticoat are worn till they disintegrate and drop off."*

Housing in the towns varies considerably, but it is generally true to say that the workers are badly housed. There is much overcrowding and, to give one example, the average occupation of a dwelling in Colombia works out at about eight people. Houses in towns are fortunate if they have water supplies and sewage disposal provided by the municipality. A town such as Belize, capital of British Honduras, may have no piped water supplies and a town such as Cartagena in Colombia may have no sewage system. While housing for the masses in urban areas usually leaves much to be desired, except perhaps in Uruguay, many governments are now tackling the problem, and some, such as the Dominican Republic, have made notable progress. It is also worth noting that some large business organisations, such as the oil companies and the textile concerns in Antioquia, Colombia, provide excellent houses, well laid out in model villages, for their employees. But the fundamental fact remains that most dwellings lack the usual amenities and are very unhygienic.

URBANISM

There is one last aspect of the social geography of Latin America which requires a mention: this is the phenomena of urban growth. Not only is the population of the region increasing at an unprecedented rate but it is also becoming increasingly concentrated in big cities or urban agglomerations as they might be more properly called.

Until a generation ago there were only four cities in the whole of Latin America—Buenos Aires, Río de Janeiro, São Paulo, and Mexico City—possessing more than a million people. But these four major cities presaged the pattern of things to come. Today there are at least a dozen cities with populations of over a million and another ten with populations between 500,000 and 1 million. While town populations are swelling almost everywhere, the outstanding fact is the exaggerated growth of the metropolitan centres. Some capital cities, *e.g.* Buenos Aires, Montevideo, Santiago, Caracas, contain an undue proportion of the population of their respective countries.

Brazil provides a convenient example, illustrating particularly well this growth of urbanism and its attendant problems. The emphatic trend towards urbanisation is illustrated clearly enough by a comparison of the census figures for 1940 and 1950. Between these two dates the rural population increased by 18%, whereas the urban population increased by 49%. The censal figure for 1960 showed that urban population continues to rise rapidly. This accelerated urbanisation reflects to a very substantial degree the remarkable industrial expansion currently taking place, especially in the hinterland of Río de Janeiro. The progress made in industrialisation has promoted the migration of the excess rural labour

* *Latin America*. P. 155.

force into the towns, but this drift to the coastal and near-coastal cities has now reached dangerous proportions, for not merely is it denuding the countryside of workers, it is also imposing a severe social strain upon the country. One of the reasons for the building of the new capital, Brasília, in the heart of the Central Plateau was the hope that it will help to counteract the urban sprawl and help to decant some of the population to the under-populated west.

One of the undesirable concomitants of urban growth is the development around many of the cities of shanty-towns. These unorganised, unplanned settlements, which are called *favelas*, are inhabited by people who have drifted in from the backlands, attracted by city life and the opportunities for work offered by Brazil's growing industries. Almost all the larger, growing cities, e.g. Rio de Janeiro, São Paulo, Belo Horizonte, have their *favelas*.

Urbanisation manifests itself in almost every part of Latin America and the intensity of this process of urbanisation is reflected in the following figures illustrating the growth of a number of cities selected more or less at random.

TABLE IV
Population Growth of Selected Cities

| | 1930 | 1940 | 1950 | 1960 |
|------------------------|---------|-----------|-----------|-----------|
| Guadalajara (Mexico) . | 176,000 | 200,000 | 229,000 | 734,000 |
| Medellín (Colombia) . | 100,000 | 180,000 | 300,000 | 690,000 |
| São Paulo (Brazil) . | 900,000 | 1,500,000 | 1,776,000 | 3,777,000 |
| Curitiba (Brazil) . | 90,000 | 125,000 | 180,000 | 361,000 |
| La Plata (Argentina) . | 180,000 | 200,000 | 218,000 | 357,000 |
| Asunción (Paraguay) . | 90,000 | 100,000 | 140,000 | 207,000 |
| Santiago (Chile) . | 696,000 | 750,000 | 1,105,000 | 1,852,000 |

Chapter III

RESOURCES AND ECONOMY

FEATURES OF THE ECONOMY

DISTINGUISHING CHARACTERISTICS

Just as Latin America forms a distinctive cultural region, it possesses certain distinguishing economic features, although these features are not unique; they are shared to some extent by other underdeveloped lands and by other countries with nascent nationalism. Four points are worth emphasising with regard to Latin America's economic geography:

(1) While there are extensive areas awaiting exploitation, it is misleading to look upon Latin America as a virtually virgin region; the truth is that the region in many places has been vigorously exploited, even ransacked, for 400 years by Europeans who extracted wealth from it without let or hindrance, with the result that in many areas its resources have been depleted. It is necessary that one should be aware of this fact and appreciate its importance. On the other hand, although the region has been exploited with a measure of ruthlessness, it is still rich and contains vast resources waiting to be tapped.

(2) The majority of the Latin American countries live by the export of food commodities or raw materials, and they have developed, characteristically, as single-crop or single-commodity countries. While this dependence upon one item is breaking down and a greater diversity of economy is developing, already far advanced in some states and notably so in Brazil, it can still be said that many countries rely upon one main economic prop, *e.g.* Uruguay, beef; Brazil, coffee; Bolivia, tin; Venezuela, oil; Honduras, bananas; Cuba, sugar. Economic dependence upon a single crop or commodity is dangerous, however, for in times of economic depression or falling prices countries which put all their eggs in one basket are badly hit.

(3) The nature of the commercial activities of Latin America varies between region and region, and a broad distinction can be made between tropical Latin America and temperate Latin America. In Central America and tropical South America plantation products are generally supreme; in mid-latitude South America live-stock rearing and cereal-crop production dominate the economy. Moreover, there are wide variations between place and place with respect to arable farming and animal husbandry, for intensive, extensive, and subsistence systems of farming prevail. Almost every type of farming between the most modern highly mechanised kind

and the most primitive shifting agriculture is to be found within Latin America.

(4) A fourth distinguishing feature is the prevailing mood of economic nationalism. Although most of the Latin American states achieved their political independence almost a century and a half ago, that political emancipation proved to be only nominal, for they remained economically dependent. All the Latin American countries are impatient for economic independence. Their impatience has led to the growth of economic nationalism. This desire to stand on their own feet and to rid their continent of economic colonialism has led many countries, more particularly the larger and more advanced of them, to pursue a policy of industrialisation, somewhat feverishly carried out, which they believe will achieve the desired result.

THE TRADITIONAL AGRARIAN SYSTEM

The countries of Latin America which historically formed Spanish colonial territory have inherited, to a greater or lesser degree, Spanish cultural features. One of these features which is significant from the economic point of view is the traditional agrarian system. While the original Spanish system no longer obtains anywhere in Latin America in an unmodified form, it has bequeathed certain recognisable features to the pattern of land ownership and use.

Professor Preston E. James has elicited four characteristics of the Spanish traditional agrarian system which have relevance to present-day socio-economic problems.* The first is the prestige value accruing from land ownership. Ownership of land implied aristocratic position in the community. The landlord was looked up to and respected. And at the present time this tradition lingers on. Secondly, land was owned *per se* and not because of its economic value; whether the land was good or bad, productive or unproductive was immaterial; it was the fact of owning land that mattered. As a consequence of this, much good arable land is still reserved as pasture, although it could be put to much more productive use growing crops. Thirdly, the land came to be concentrated into the hands of a small minority class who came to exert and wield a political control completely disproportionate to their numbers. Though numerically few, these people came to control, as often they still do, the affairs of state. This power was usually exerted indirectly through the medium of the officers of the armed forces. Fourthly, and this feature is a corollary of the others, the overwhelming bulk of the people who lived on and by the land did so as acutely impoverished tenant farmers or servile labourers. Today landless peasants, subsistence farmers, and estate labourers constitute the vast majority of the rural population, whose lot, more often than not, is one of poverty, hunger, and misery. In many parts of Latin America the land continues to be held in large properties, as, for example, in Argentina

* *The Changing World*. Ed. W. G. EAST and A. E. MOODIE. London. 1956. Pp. 902-5.

with its *estancias*, in Chile with its *haciendas*, and in Brazil with its *fazendas*. Some changes, of course, there have been as in Mexico, where the former haciendas have been broken up.

The economic attitudes of the Portuguese in Brazil showed marked differences. Here, though large estates did, and still do, exist there was not the peculiar Spanish attitude towards land. From the earliest days of Portuguese colonisation the colonists, finding no gold or silver, had had to support themselves by the land. Moreover, the Portuguese had a different cultural tradition and a realistic business sense. Hence the Spanish idea of unprofitable land ownership possessed no appeal to the Portuguese. For the commercially-minded Portuguese economic ventures had to pay handsome dividends. Thus it was that Brazil's economic development revolved around a series of speculative investments first in sugar, then in gold, and so on up to coffee in recent times. Portuguese economic enterprise in Brazil was distinguished by a series of cycles which exhibited the same pattern of rapid development, highly profitable peak, and subsequent decline of a specific commodity.

Another difference is apparent between the Portuguese and Spanish agrarian systems. The Brazilian tenant farmer is a freer agent than his counterpart in most of the "Spanish" countries. He is not attached to any particular landowner as, for example, the *inquilino* of Chile is; he is much more mobile and migrates freely if new economic opportunities present themselves.

In drawing attention to these traditional and lingering features of the agrarian systems of Latin America, one must be careful not to over-emphasise their importance or their ubiquitousness. Rapid modifications of the old system are taking place throughout the Latin American world. In some countries, as in Mexico, for instance, the revolution put an end to the traditional system and eliminated the land-owning class; in others, such as democratic Uruguay, although the large estate is still very much in evidence, a benevolent government has created a welfare state that is the envy of most other Latin American countries.

FOREIGN ENTERPRISE AND INVESTMENT

To a very considerable degree the exploitation of Latin America's resources, whether of land, mine, or forest, and the development of her public utilities and manufacturing industries, are the result of foreign enterprise and investment.

The legend of *El Dorado* from the days of the *Conquistadores* lured men to Latin America. Though *El Dorado* proved to be a myth, the idea persisted, becoming adapted to new and changed circumstances; there developed what George Pendle called "the *El Dorado* outlook." Latin America offered possibilities of riches other than precious metals and stones: it could produce the commercial commodities—sugar, cotton, tobacco—wanted by Europe. "Europeans," Preston James has written, "began to appreciate the possibility of utilising the resources of the New

World to bolster the failing economies of the Old."* British, French, and Dutch began to invest money in West Indian plantation developments.

Later, when the Spanish colonial empire began to disintegrate, Britain saw in those colonial territories a great new market for British manufactured goods. For the time being this new El Dorado proved to be as much a mirage as the old one. But gradually as political conditions became more settled and as immigrants began to flow in during the latter half of the nineteenth century, El Dorado beckoned once more. Britain, then the world's wealthiest power and greatest creditor nation, commenced to pour capital into South America, especially into Argentina and Uruguay. By 1913 British investments in Argentina totalled £400 million; they continued to increase right up to the time of the great depression in the early 'thirties, probably topping the £500 million mark. In Uruguay British investments reached nearly £50 million in 1913. It has been estimated that at the beginning of the First World War total foreign investments amounted to at least £1500 million.

Without the aid of foreign capital and enterprise the exploitation and realisation of Latin America's resources would have lagged seriously behind. And so, also, would the region's economic development and prosperity. One or two examples will be sufficient to illustrate the degree to which Latin America has been developed by the foreigner. Prior to the Second World War Britain had built and owned 20,000 out of a total of 26,800 miles of railway in Argentina. In Chile three United States-owned companies share 90% of the total copper output. Venezuela's oil, which has made that country rich, has been tapped by foreign concerns. The United Fruit Company of the United States owns the bulk of the banana plantations, which it has developed, in Guatemala and Honduras. Scores of other examples could be cited. Latin America owes a great debt to foreign, and in the past especially British, investment, enterprise, and technique.

The growth of anti-foreign nationalism and economic nationalism in Latin America during the past two or three generations, but especially since the end of the Second World War, has had important repercussions upon foreign investment. As a result of the war itself Britain found herself in debt to Argentina and Uruguay, and to liquidate those debts Britain handed over the railways she owned. But many of the Latin American states, in an attempt to achieve economic independence and to shake themselves free from economic colonialism which was anathema to their national pride, refused to give foreign enterprise a free hand, placed restrictions on foreign investment, expropriated foreign property, and defaulted on foreign debts. Argentina, suffering a phase of acute nationalism which took on an aggressive note during the totalitarian regime of General Perón, was the most intransigent of all the Latin American countries. The effect of Perón's rule and his policy of industrialisation and national self-

* *Op. cit.*, p. 912.

sufficiency has proved to be disastrous. Other countries adopted a similar, though less confining, attitude. Guatemala, for instance, refused to allow foreign prospectors to carry out exploration for oil and expropriated some 400,000 acres of land (now returned) from the United Fruit Company. Brazil formed an oil company, *Petrobras*, to search for oil, but no foreigner was allowed to own shares in it.

The prosperity of Venezuela, however, which has welcomed foreign help and investment, and the gradual realisation that, in spite of the growing accumulation of national capital, Latin America cannot do without foreign capital if its development is to be effected speedily has caused second thoughts in many quarters. In the last few years the flow of European investment into Latin America has begun to assume the dimensions of a torrent. The recovery of the European nations from the exhaustion of the war and the uncertain conditions in the Middle and Far East are making capital available for investment in Latin America. Both Britain and France are diverting capital there, while Western Germany ranks second only to the United States as an investor of capital in Brazil.

A REGIONAL MARKET

Latin America's intense dislike, even fear, of economic colonialism and the fervid growth of nationalism have led not merely to a drive for economic self-sufficiency and rapid industrialisation but to tentative considerations of wider economic matters: to, in fact, the idea of a Latin American regional market.

In August 1957 an Inter-American Economic Conference was held in Buenos Aires, and one of the most far-reaching decisions taken by this body was to explore the possibilities of creating a Latin American regional market. In February 1960, at Montevideo, seven Latin American nations signed a treaty that led to the formation of a Latin American Free Trade Association. LAFTA, as it has become known, was designed to achieve gradual economic integration by selectively reducing tariffs on intra-regional trade. By exempting agriculture and livestock, the two most important exports of these countries, the agreement was expected to have its primary effect on industrial products. Because of differences in the level of development attained by member nations, the treaty avoided sweeping automatic tariff reductions such as those envisaged by the European Economic Community. Member nations were left free to determine their own tariff structures outside the free-trade area, and little provision was made for coordinating national economic policies. Nevertheless, after only five years of operation, the value of intraregional trade had grown by almost 65%, as against a 25% rise in overall exports, and as a percentage of total trade it had risen from 7.2% to 9.5%. Despite this rapid expansion of trade within LAFTA and despite the fact that almost all countries in the region had joined the organization, many

persons were dissatisfied with its progress, and especially with the slowness of negotiated tariff reductions.

Why have the Latin American countries adopted this idea? Perhaps three main causes are discernible.

In the first place, the idea may be regarded, at least in some respects, as an answer to the Western European countries' plan for the development of a European Free Trade Area. The Latin American countries have long exported their goods to Europe and found one of their biggest markets in the highly industrialised, thickly populated countries of Western Europe. They fear that a European Free Trade Area will divert the European demand for foodstuffs and industrial raw materials away from Latin America in favour of African territories to which many of the Western European nations are more closely tied.

The influence of the United States—politically, culturally, economically—has been paramount in Latin America for several decades. The United States offers the Latin American countries their largest market, and although the Latin Americans welcome this economic situation and even go so far as to complain that the United States does not do sufficient to help her weaker southern neighbours, there is at the same time, a feeling that Latin America may be manoeuvred into too great a dependence upon the United States. The immediate and long-term prospects for Latin America are good so long as the population, economy, and standard of living of the United States continue to expand. Any halt or recession in the latter would have severe repercussions in Latin America. The establishment of a Latin American Free Trade Area will be not merely beneficial to the countries concerned but may lessen their dependence upon the United States; moreover, it may cushion the effects of any economic crisis consequent upon any decline in United States industrial activity or economic prosperity.

Finally, there is the growth of the feeling of mutual self-help among the Latin American countries. As tensions between the republics subside, as frontier disputes become resolved, and as a Latin American consciousness develops, not to mention the political and military security aspects, the desire among forward-thinking Latin Americans is for closer co-operation and mutual assistance to enable the development of the area to be speeded up and the living standards of the peoples improved more quickly. While Latin American ideals have sometimes included federal union, an ideal which the stark facts of geography and history probably rule out, there is nothing to prevent an economic union. We are living in an era when regional groupings are a characteristic feature of world society and the Latin American group has everything to gain and nothing to lose as a result of its having formed a regional association.

In Central America discussions on the economic integration of Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua began in 1952, and in 1957 a regional industrialization pact was approved at a meeting of the Economic Ministers of the states concerned. A treaty signed by

Guatemala, Honduras, and El Salvador in February 1960 provided for the elimination of all tariffs within five years. By 1965 the Central American Common Market (which now included Costa Rica but not Panama) had eliminated 95% of internal customs duties and had imposed a common external tariff on 98% of the items on regional customs classification. To equalize and stimulate growth within the market, a Central American Bank for Economic Integration was established.

LAND UTILISATION

Agriculture is the chief means of livelihood throughout Latin America. It is the basic economic activity and serves two ends: the provision of the essential wants of the region's people and the supply of foodstuffs and raw materials for overseas markets. The role of agriculture in the national economies, the systems of agriculture in Latin America, and the methods and techniques of farming within the region vary widely. The same diversity as manifests itself in other aspects of Latin America's geography is characteristic of agriculture. Broadly speaking, however, three types of farming dominate Latin American agriculture: these are pastoralism, subsistence farming, and commercial crop growing. Before briefly reviewing these, it will be useful to note the difficulties and problems which beset the Latin American farmer.

THE HANDICAPS TO FARMING

There may be said to be three principal physical obstacles to farming in Latin America: the large areas of dense tropical forest; inadequate rainfall over considerable areas; and steep slopes in the mountainous regions.

Although Europeans have been settled in Latin America for over four centuries, the forested areas of the inter-tropical zone still remain virtually untouched. Man has nibbled, as it were, around the edges, but the forest remains unconquered. Along the eastern margins of Brazil appreciable areas have been cleared, it is true, and patches have been cleared in the Caribbean region also, but the vast basin of the Amazon remains untouched almost in its entirety. Torrential rains, leached soils, rapid weed growth, insect pests, plant blights, and rapid soil exhaustion are some of the difficulties with which the farmer has to contend. The forests elsewhere, such as the warm, temperate forests of southern Brazil and the forests of south Central Chile, have proved to be less difficult to deal with than the rank growth of the tropical areas; large-scale clearance, for both cropping and pasturage, has been undertaken in the two areas exemplified, though the forest has by no means been obliterated.

Inadequate rainfall, in the sense that there is a deficiency in the total amount or a marked seasonal deficiency, presents a second problem. The areas of absolute aridity in Latin America are fortunately small, but there are considerable areas suffering from inadequate rainfall either because of

light or erratic precipitation, as in the Northern Plateau of Mexico, the shoulder of Brazil, north-western Argentina, and Patagonia, or because of a distinctly seasonal rainfall regime, as in the areas of tropical grassland or in the "Mediterranean" region of Central Chile. Cropping in such areas of insufficient rainfall or during the dry season is dependent upon irrigation. Irrigation techniques have been practised in Latin America since pre-Columbian times, but it is only within relatively recent times that major irrigation projects have become part and parcel of large-scale land utilisation development, *e.g.* in Mexico and north-eastern Brazil.

In the high mountainous areas of Central and South America, where paradoxically many people have long lived and continue to live, steep slopes are very common, and such slopelands create great difficulties for cultivation. Many almost impossibly steep slopes are, however, actually under cultivation. In the central Andes the Incas laboriously terraced these plunging hill slopes, and one is filled with admiration and awe for these efforts and, indeed, for the present-day cultivators who still continue to till these nearly vertical fields. According to estimates, 70% of all the cultivated land in the high Andes has angles of slope exceeding 35 degrees. Such slopes cannot normally be satisfactorily cultivated and needs must be tilled by hand. Where the slopelands are not terraced there is, of course, great danger of soil erosion when they are cleared of vegetation and put under cultivation, and many areas have in fact been very seriously eroded, some beyond all hope of redemption.

Other physical conditions, including marshes and seasonal flooding and poor soils (60% of all the cultivated land in the Andes is reckoned as being below medium quality) also handicap cultivation in certain areas. There are, in addition, social, economic, and political conditions which have hindered agricultural development, *e.g.* the attitude to land ownership, the dependence upon crop staples, traditional techniques, inadequate communications, political instability, etc.

PASTORALISM

In earlier days the raising of livestock, especially of cattle, was the most important aspect of farming carried on by European immigrants. Whereas forest lands have to be cleared before the land can be cultivated, the natural grasslands, whether of the tropical or temperate kind, offer immediate possibilities for stock-rearing. For this reason man early began to utilise the natural grasslands, and it is generally true to say that such areas have been more fully utilised than the other areas. Cattle and sheep were introduced into the Americas by the Spaniards and Portuguese in the sixteenth century, and since that time extensive grazing has been a major economic activity in many parts of the region.

The *pampas* of Argentina and Uruguay, the *llanos* of Venezuela, the *campos* of Brazil and the semi-arid steppelands of the Mexican Plateau and

Patagonia have a long history as stock areas. In the beginning cattle roamed the ranges freely and no attempt was made to herd and improve the animals. In fact, until the nineteenth-century developments of barbed wire, canning, and refrigeration there was little in the way of systematic animal husbandry. During the present century the pastoral industry, to compete in the world market, has had to change its traditional character; now bloodstock is imported, controlled breeding is being adopted, feed-stuffs are being grown, and communications are being improved.

Broadly speaking, the inter-tropical lands are the cattle lands and the temperate areas the sheep lands. For example, cattle-rearing has been dominant in South America, outside the Andean region, roughly as far south as the pampas. The warm temperatures and more abundant rainfall have been more favourable to cattle than to sheep; on the other hand, beyond approximately the 35 degree S. parallel, cooler and drier conditions prevail, and these have favoured sheep rather than cattle; the result is that Patagonia is essentially a sheep-rearing area. Similarly in Mexico, sheep are bred mainly in the drier north.

All in all, the extensive tracts of grassland and dry steppe make Latin America eminently suited to stock-rearing. The stock regions, though they do suffer drought in most areas, are less prone on the whole to the calamitous droughts which assail Australia and South Africa and which periodically cause grievous losses. Moreover, Latin America's grazing lands are still largely under-stocked: except for the more humid grassland areas of Argentina, Uruguay, and Southern Brazil, the animal population is relatively sparse. The tropical savannas offer vast areas of pasture capable of supporting greatly increased numbers of stock. At present their stock potential is limited by such conditions as lack of water supplies, locust infestation, insect pests, poor communications, and insufficient market demand.

SUBSISTENCE AGRICULTURE

When the Spaniards and Portuguese first arrived in Latin America they found the aboriginal Indians living in the lowlands and on the plateaus east of the Andes few in numbers and primitive in culture. They possessed no domesticated animals and indulged in little cultivation. For the most part they subsisted by a collecting and hunting economy, gathering wild fruits, roots, etc., snaring the small fry of the forests, or catching the rhea, guanaco, and other animals of the grasslands, and upon fishing. The isolated Indian groups of the interior, such as the Boro, Motilones, Chavante, and Otomac Indian tribes, live in this fashion to the present day. Food collecting and hunting are, however, frequently augmented by a little primitive cultivation.

The more advanced Indians of the Andean lands and Middle America, such as the Aztecs, Mayas, and Incas, had developed the arts of the domestication of animals and the cultivation of crops. They had tamed the llama, using it as a beast of burden, and had the turkey, and grew a variety of

crops, including maize, beans, and potatoes, on the plateaus, terraced mountain slopes, and valley floors. The Spanish Conquistadores showed little interest in agriculture, but even if they had, the climate of the highlands was ill-suited to most European crops; hence in the Andean region agriculture has remained very largely of the indigenous kind. This is also true of most of the highlands of Central America. The Portuguese showed a greater measure of interest in agriculture and introduced several crops into Brazil; nevertheless, over much of the Brazilian Highlands agriculture follows the indigenous pattern.

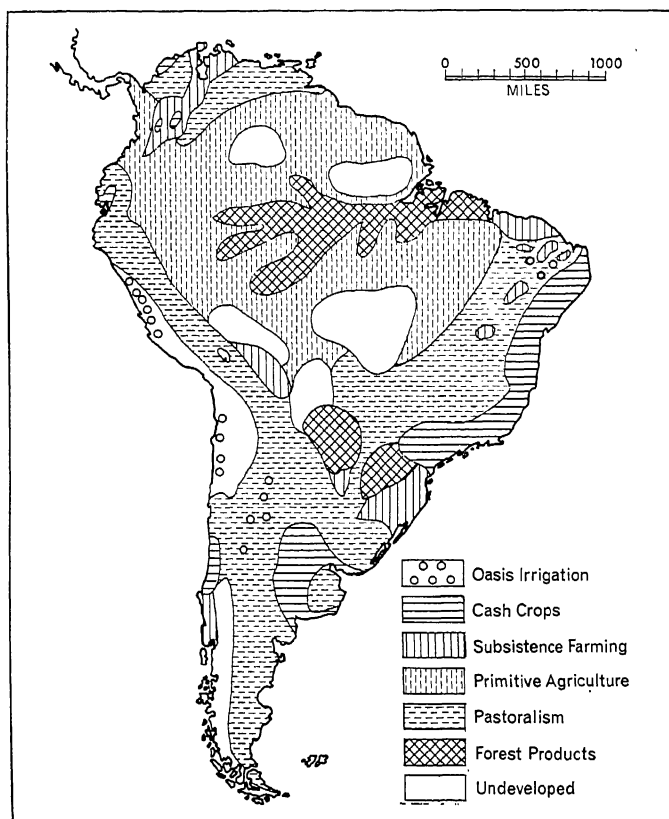


FIG. 27.—Economic regions of South America.

Over wide areas of Latin America subsistence farming is the characteristic type of farming. Native subsistence agriculture is carried on in communally-held land (as in Bolivia and Peru), on individually controlled plots (as in Venezuela and Haiti), and on land provided by plantation owners (as in Brazil and Colombia). Typically, patches of land are cleared of forest or scrub, usually by the "slash and burn" technique, crops are grown for a year or two until diminishing yields, due to the exhaustion of

the soil, compel the cultivator to abandon his plot and clear fresh land. He grows such crops as maize, manioc, yucca, potatoes, beans, and vegetables, to feed himself and his family; occasionally he may grow a cash crop to provide him with sufficient money to purchase such goods as he cannot make himself. His agricultural equipment is of the crudest type, a hoe or spade or digging-stick and a primitive wooden plough.



[Courtesy: Bolivian Embassy.]

FIG. 28.—Primitive implements of this kind are still usual—not that modern tractors would be of much use on the steep mountain slopes! Note the terracing in the background and the stony soil in the foreground.

Subsistence agriculture, especially of the shifting kind, is a wasteful and economically not very productive system of farming; it involves large numbers of people wresting a bare livelihood from the soil and utilising land with a minimum of efficiency. But until agrarian reform becomes more widespread, traditionalism is broken down, agricultural education is increased, and the Indian becomes interested in cash cropping, subsistence agriculture is likely long to remain an important feature of the agricultural pattern.

COMMERCIAL AGRICULTURE

Commercial agriculture, taken as a whole, is not as important as one might be led to expect from the facts that the majority of the people living

in Latin America are employed in agriculture and that agricultural products are responsible for most of the region's exports. This is due partly to the circumstance mentioned above, that so many people appear to be content merely to subsist, and partly to the small total acreage devoted to commercial crops.

Commercial agriculture, especially of the plantation type, has long been established, however, in various parts of the inter-tropical zone. Many Europeans who came to Latin America with high hopes of gaining riches quickly were sadly disillusioned and compelled to take up farming to live. The Spaniards and the Portuguese found the native Indians few in numbers or unwilling to work; hence the Europeans were compelled, so long as they too were few in numbers, either to engage in stock-rearing, which was economical of labour, or to import African slaves to work for them. The early plantations in both the West Indies and eastern Brazil were developed by Negro labour.

As the demand in Europe for such tropical crops as sugar, tobacco, cacao, and coffee increased, so likewise did commercial agriculture expand. At first the commercial agriculture was purely of the plantation type, especially since the demand was for plantation crops. This plantation agriculture was confined to inter-tropical America, as, indeed, it still is. During the nineteenth century some of the temperate areas were developed and devoted to commercial cropping; they are concerned with the large-scale production of wheat, maize, and linseed, largely for export. The Argentinian pampas became one of the major producing areas of temperate cereals in the world. During the present century other types of commercial agriculture, notably fruit growing, horticulture, and dairying, have appeared, though only relatively small areas are as yet concerned with these more recent developments.

Broadly speaking, commercial agriculture is carried on under three different systems: first, by large concerns, perhaps State-owned and run, as in the case of the Dominican Republic, or by corporations, such as the United Fruit Company, which has large plantations in Middle America; secondly, by large individually owned estates, such as the haciendas or fazendas, which employ large numbers of poor, landless, and often illiterate labourers; and thirdly, by smallholders, such as those of Costa Rica, who grow small quantities of specialised commercial crops in addition to subsistence crops.

PRODUCTS, PATTERNS, AND PROSPECTS

The wide variations in climate allow practically every crop to be grown somewhere in Latin America. But since the greater part of the region lies within tropical latitudes, tropical crops make the greater contribution to the total commodity output. Of the commercial crops coffee, cacao, sugar, bananas, citrus fruits, cotton, sisal, tobacco, sunflower seeds, and linseed are the most important; and in each case Latin America's contribution to world total production is substantial (see Table V). The chief and

only important temperate cereal which is grown commercially for the export market is wheat; the bulk of it is grown in Argentina, but the total production of wheat and the quantity exported have both shown a substantial decrease in comparison with the situation in pre-war days. Of the subsistence crops, maize, manioc, potatoes, and beans are produced in very large quantities. Latin America, too, has a near monopoly of several

TABLE V
Approximate percentage of total world production

| | |
|----------------------|-----|
| Coffee . . . | 90 |
| Cacao . . . | 26 |
| Sugar-cane . . . | 40 |
| Bananas . . . | 58 |
| Citrus Fruits . . . | 20 |
| Cotton . . . | 9 |
| Linseed . . . | 17 |
| Sunflower seed . . . | 24 |
| Sisal . . . | 12 |
| Henequen . . . | 100 |
| Tobacco . . . | 5 |

crops of lesser and minor importance, including yerba maté, quebracho, chicle, coca, Brazil nuts, carnauba wax, arrowroot. The principal animal products are wool, hides, and meat, which come chiefly from Argentina, Uruguay, and Brazil. Once the world's major exporter of meat, Argentina has now lost much of its exporting capacity (*see* p. 423).

In many Latin American countries emphasis is placed upon the production of commodities for export, *e.g.* wool, coffee, sugar, rather than food-stuffs. This means that food, often in large quantities, has to be imported: this, in fact, is the situation in Venezuela, Peru, Bolivia, and Paraguay, and even to some extent in Uruguay. And yet there is no shortage of cultivable land. The situation is aggravated, moreover, by the primitive methods of agriculture frequently practised, by low yields, and wasteful land use. Speaking generally, agriculture is primitive and farming techniques backward in most Latin American countries; the only exceptions to this general statement are Argentina, Uruguay, and Brazil, and even the last named qualifies merely in part.

Although some countries have sacrificed agricultural development for industrial expansion—a trend which has been most marked in Argentina but has also characterised Uruguay and Venezuela—most governments are now seriously endeavouring to redistribute the land and to improve farming techniques and farm stock. These measures, desirable as they are, require more capital than most countries have got to spare, expert guidance and agricultural education, in which nearly all the republics are lacking, and a public-spirited outlook on the part of the landed class towards the poor, illiterate, landless peasantry. Latin America's agricultural potentialities are immense, but their realisation is likely to prove a slow business.

The agricultural picture has been well summed up by Sir Ronald Fraser: "Agriculture, though in some favoured districts highly advanced, is on the whole backward, a scratching of poor and exhausted soil, a frantic search for new. Much is still done with the pointed stick; whole regions have not seen the steel plough; there is widespread carelessness in the use of the land, even in Argentina, and certainly in Brazil. Thus, although there is almost no product that cannot be grown and almost no animal that will not thrive in some part of a region that stretches from the tropical to the sub-polar, and every kind of farming is seen from a crude subsistence agriculture, sometimes of an itinerant character, to the great estates, sometimes owned by corporations, with their capital, their managers and their machines, it is easy to see why a region of the world that could be virtually self-supporting in foods, fats, fibres, timber, and most other products is not able to raise enough of them for all purposes and has sometimes to import them from elsewhere."*

MINERAL RESOURCES

Complete geographical exploration, much less geological survey, remains to be effected in Latin America. Even regions that may be claimed to be fairly known have not been thoroughly surveyed from the point of view of their mineral wealth. Any estimate of Latin America's mineral resources must be, therefore, something in the nature of an interim assessment, for the full endowment of mineral wealth is not yet appreciated. While some of the mineral resources have been known, and indeed exploited, for a long time, others have been found only recently, and new discoveries are being made almost every year. In a broad way, however, the resources pattern is known, and the situation may be summed up thus: Latin America possesses a fair variety and moderate proven reserves of the world's important economic minerals; though very poorly endowed with coal, she has valuable petroleum and water-power resources, rich deposits of iron and manganese ores, and significant deposits of copper, tin, and bauxite (Fig. 29).

FERROUS METALS

Iron Ores. The iron-ore deposits in the eastern highlands of Brazil and Venezuela are among the largest known in the world; moreover, they are high-grade ores. Lesser, but still very noteworthy, deposits are found in northern Mexico, in Cuba, and in central Chile.

The Brazilian Pre-Cambrian ores in the states of Minas Geraes and Bahia have been estimated at 13,000 million tons, and in the Itabirite formations alone there exist some 3500 million tons of haematite ore with an iron content of 60–70%. The Cerro Bolívar deposit in Venezuela, discovered in 1947, and estimated to contain 500 million tons of high-grade haematite, has been described as the "richest and greatest iron deposit in

* *Latin America*. London: Hutchinson. 1953. P. 184.

the history of the world." Near by are the older deposits of El Pao, discovered in 1920. Both of these deposits, together with others, occur in an 80-mile-wide belt of hills, consisting of quartzite rock, which lie just south of the lower Orinoco. These Venezuelan deposits are of especial value because of their accessible location, a geographical factor almost or equally as important as the size and quality of a deposit.

Magnetite ores, occurring in igneous rocks, are found in Mexico and Chile. In Mexico deposits are found near the coast at Las Tuchas in Michoacan State, where lie an estimated 25 million tons of magnetite ore of good quality, and in the Cerro de Mercado, in Durango State, where an estimated minimum of 25 million tons and a possible maximum of 100 million tons occur. Chile's high-grade magnetite ores, whose rich reserves are estimated at about 3000 million tons, come chiefly from Tofo and Algarrobo. Cuba has deposits of high-grade ores (51-68% iron) estimated conservatively at about 30 million tons, but, in addition, she possesses huge reserves of lateritic iron ores estimated at over 3000 million tons. Vast deposits have been located in Bolivia. The above are the major deposits; there are many other minor deposits scattered throughout the region, *e.g.* in Peru, Colombia, Argentina, and Paraguay. Small deposits also occur in Guatemala, Honduras, Nicaragua, and Costa Rica, but the only noteworthy reserves are those at Agalteca in central Honduras, where there are some 8 million tons of haematite and magnetite ores. Table VI summarises the various deposits of iron ores in Latin America.

TABLE VI
Iron Ores (million metric tons)

| | <i>Reserves Proven and Potential</i> | <i>Output 1962</i> |
|---------------|--|------------------------|
| Mexico . . | 500 | 1.1 |
| Cuba . . | 3,000 | ? |
| Colombia . . | 100 | 0.5 |
| Venezuela . . | 2,200 | 14.3 |
| Peru . . | 740 | 6.5 |
| Brazil . . | 20,000 | 10.0 |
| Chile . . | 3,000 | 7.8 |
| Bolivia . . | 50,000 | 0.0 |

Manganese. Manganese is the most important of all the various metals which are used in the making of steel alloys. There is, moreover, no substitute for manganese. Compounds of manganese are also widely used in different branches of the chemical industry, as in the manufacture of paints, dyes, disinfectants, and fertilisers.

Manganese occurs in tremendous deposits in Brazil—deposits which are in all likelihood the most extensive in the world. The ore is worked in two localities, at Nazaré and Lafaiete, both in eastern Brazil. Brazil produces about 1 million tons a year. Reserves of manganese ore in the Urucum Hills, near the town of Corumbá in south-western Mato Grosso

State, exceed 30 million tons. The continental interior location of these resources presents formidable transport difficulties. More recently, extensive deposits have been found in the Territory of Amapá, and these, being readily accessible, are now being worked.

Manganese occurs, also, in Mexico at San Domingo, in Cuba at Bayamo, and in northern Chile chiefly from the province of Coquimbo, where there are very large reserves having an average ore content of 46%.

OTHER FERRO-ALLOYS

Of the other ferro-alloys chromium, nickel, tungsten, molybdenum, and vanadium are found in Latin America. The only important known deposit of chrome ore occurs in Cuba where it is mined at Alta Gracia. The Cuban lateritic iron-ore deposits are rich in chrome and nickel. Production of refractory chromite is steadily increasing. In Central America small chromite deposits have been worked in Guatemala.

In 1953 a 40-million-ton nickel-cobalt deposit was discovered at Moa Bay in Oriente Province, Cuba, and a processing plant has been set up. This vast deposit means that Cuba is potentially one of the world's most important sources of nickel. At present she ranks fifth with an annual production of 11,000 metric tons. At Niquelândia in the State of Goiás, Brazil, there is an estimated 20-million-ton deposit of nickel. This deposit has been partly developed.

Tungsten, occurring in its mineral ore, wolframite, is found in Bolivia, Peru, Argentina, and Brazil, but only Bolivia is a significant producer, the annual production of between 2000 and 3000 metric tons being about 7% of total world production.*

Outside the United States, which has a virtual monopoly of the world production (over 90%) of molybdenum,* Chile is the only other significant producer. Output, some 400 tons a year, comes as a by-product of the refining of copper at El Teniente.

The world market in vanadium* is again dominated by the United States, which accounts for about 85% of total production. One of the greatest vanadium deposits in the world is to be found at Minaragra in Peru. Here, at a height of 15,500 ft, is situated one of the largest vanadium mines in the world. Peruvian output of vanadium has fluctuated considerably, however: at times it has accounted for a quarter of world production, but in 1955 it accounted for less than 1% (78 tons).

NON-FERROUS METALS

Copper. Fairly abundant deposits of copper occur in the Andes and in Mexico. Chile, with an annual production of about 600,000 tons, ranks as the world's second producer. The great deposits at Chuquicamata, located at over 9000 ft in the Atacama Desert of northern Chile, supply more than half the country's total output. Chile's reserves of copper are estimated at about 50 million tons. The Chuquicamata deposit

* Excluding output of the U.S.S.R. and Soviet satellite states.

"contains what is probably the largest known deposit of copper ore in the world, and it is certainly the largest body of oxidized disseminated ore."* Copper also occurs in Argentina, Bolivia, and Peru. Small copper properties are to be found in most of the Central American republics, but the only notable reserve is that of the Rosita mine in Nicaragua. Mexico's copper deposits are becoming exhausted, although current production remains at a fairly high level—some 60,000 tons a year.

Lead and Zinc. These two metals frequently occur together, and may, moreover, be associated with other metals, particularly silver and copper. For example, many of the silver districts in Chihuahua State, Mexico, are rich in lead and zinc. Mexico is the chief Latin American producer of lead and zinc, with around $\frac{1}{4}$ million tons of each. Peru ranks second; the lead-zinc ore body at Cerro de Pasco is one of the greatest in the world. The Potosí district of Bolivia has deposits, again associated with silver, and the annual output of both lead and zinc runs to about 20,000 tons. Deposits also occur in the extreme north of Argentina, although they are rather inaccessible. Lead-zinc deposits, mined intermittently since colonial days, are worked in Guatemala.

Tin. Bolivia has long been a major world producer of tin. She is the only major producer in the western hemisphere. Small and relatively unimportant deposits occur in northern Argentina, eastern Brazil, and Mexico. The Bolivian tin deposits occur at elevations between 12,000 and 16,000 ft in the Eastern Cordillera. Most of the tin ores come from veins running through varied rock formations. Bolivia's deposits are inaccessible and difficult to reach by adequate transport, conditions which permit the mining of only the highest-grade deposits. Many of the richer lodes are becoming exhausted or have already become exhausted; even so, there remain tremendous reserves of low-grade ores. During recent years the export of tin has dropped—from some 35,000 tons in 1953 to 28,000 in 1957 and to about 20,000 per year in the 1960s.

Silver. Mexico, Peru, and Bolivia are the chief producers of silver, with the two former countries ranking as major world producers. Mexico leads in total world output, with about 44 million oz, approximately a quarter of total world production. Peru ranks fourth with about half this amount. For long Mexico has been the leading silver-producing country in the world thanks to the prodigiously rich deposits in the Pachuca district some 60 miles north-east of Mexico City. Mining in this area has continued since 1530, and valuable reserves still remain. The occurrence of silver is widespread, however, and there are other important deposits in Aquiles Serdan and Chihuahua in the dry north and in Fresnillo to the south of the capital. The silver deposits continue to run right through Central America, and most of the republics have silver mines. Honduras is the chief producer; the El Rosario mine, some 16 miles north-east of Tegucigalpa, the capital, has shown a high productivity over a long period, making it one of the outstanding silver mines of the world.

* RILEY, C. M. *Our Mineral Resources*. New York: John Wiley. 1959. P. 102.

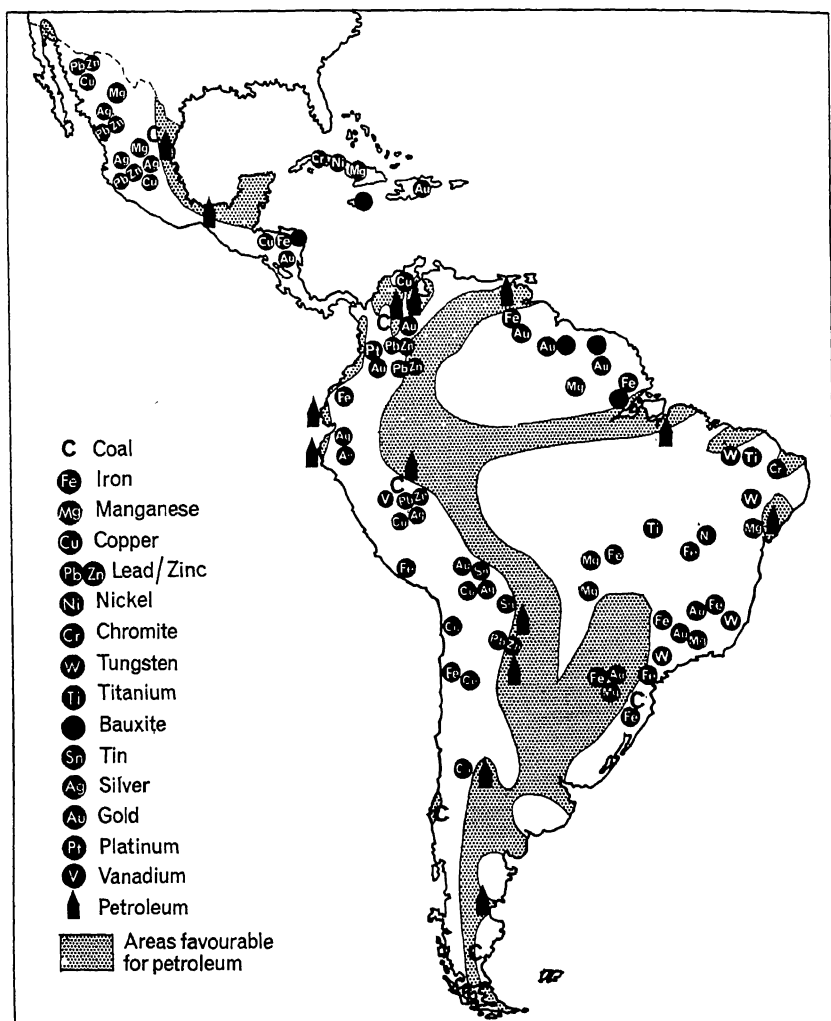


FIG. 29.—Distribution of minerals.

Gold. Gold occurs in widely scattered areas almost throughout Latin America, but only Colombia and Mexico are important producers. In Colombia gold has been mined and dredged from the rivers since the earliest days of the Spanish conquest. The Department of Antioquia yields about three-quarters of the total output, which currently runs at around 350,000 oz. Mexico produces an approximately equivalent amount, chiefly from the south central part of the country. Nicaragua is the principal gold-producing country of Central America; the total value is about £4 million yearly. The mining of gold in Brazil dates from about 1700, and the gold deposits of Ouro Preto were long worked. Though the gold deposits are by no means exhausted, they are now of small

account: in fact, only one mine is still working. Gold is dug from river gravels in the Guiana Highlands.

Bauxite. Important reserves of bauxite—the major source material for aluminium—are to be found in Latin America, chiefly in the rocks of the plateau areas. For many years the bauxite deposits in British and Dutch Guiana have formed the chief source, accounting for over a third of total world production. One of the largest, if not *the* largest, deposits of bauxite in the world occurs at Mackenzie, on the Demerara river, in British Guiana. Output is just over $2\frac{1}{2}$ million tons a year. The nearby deposits in Dutch Guiana yield about $3\frac{1}{2}$ million tons annually. In 1942 bauxite was accidentally discovered in Jamaica. Enormous deposits, estimated at some 300 million tons of high-grade ore, have now been located. The deposits lie in three areas in the centre of the island, all easily accessible and, as a result, exploitation has been rapid. Jamaica now ranks as the world's largest producer, with an annual output of more than 8 million tons. The Jamaican finds led to explorations in the nearby island of Hispaniola, and sizeable deposits were located in Haiti and the Dominican Republic; reserves are estimated at about 30 million tons. More recently, a bauxite deposit has been discovered in the Province of Chiriquí, in Panamá, and exploitation is being carried out by United States companies. Brazil, also, has notable reserves, estimated at about 150 million tons, although these are as yet untouched.

OTHER MINERALS

Other mineral deposits of greater or lesser importance occur in Latin America, and may be briefly mentioned. Platinum is found native in Colombia; production, which has declined in recent years, is about 20,000 troy oz. Colombia is the only country in Latin America possessing platinum. Antimony occurs in Bolivia and Mexico, while Mexico holds second place in the world production of cadmium.

Formerly diamonds were important in Brazil but, though by no means exhausted, are now of little account; they are far less important than the untwinned quartz crystals used in electrical equipment. Colombia is the main source of fine emeralds in the world, but these are of less importance than in the past.

In northern Chile occur the only sizeable deposits of natural nitrate in the world. They are found in the dry Atacama desert region in a 450-mile belt which varies from 10 to 50 miles in width. The practically rainless climate has preserved the nitrate minerals. Though no longer the great source of wealth that it was half a century ago, about $1\frac{1}{4}$ million tons a year of nitrates are still produced in Chile.

During recent years Mexico has ranked second in the world, after the United States, as a producer of sulphur. Output in 1956, for example, was around $\frac{3}{4}$ million tons; by 1959 it had increased to double this figure. Most of it comes from the salt domes around Minatitlán in the Isthmus of Tehuantepec. Argentina and Chile also have a minor production.

An interesting deposit is guano, which occurs in Peru. Guano is the excrement of the millions of sea-birds which live on the rainless Chincha Islands off the Peruvian mainland. These accumulated bird droppings have formed a phosphatic deposit which is also very rich in nitrogen. The Incas of Peru long ago used guano as a fertiliser, and esteemed it so highly that the penalty of death was imposed upon anyone killing a guanay bird. The guano deposits have become so depleted that they are no longer exported.

COAL

No other continental area is as poverty-stricken in coal resources as Latin America. Lack of coal is a severe handicap to industrialisation, and considerable quantities of coal must be imported. For many purposes wood is used as a fuel, and enormous quantities of timber are consumed in this way. To some extent oil and hydro-electric power are being used in lieu of coal, but the power problem is already serious in the more industrialised countries.

Such coal deposits as exist are small and widely scattered, while supplies of good-quality coal, especially coking coal, are almost completely absent. Table VII summarises Latin America's resources.

TABLE VII
Coal: Reserves and Production (million tons)

| | <i>Anthracite, bituminous coals</i> | <i>Lignite and brown coals</i> | <i>Total reserves</i> | <i>Total production 1962</i> |
|---------------|---|--|---------------------------|--------------------------------------|
| Mexico . . | ? | ? | 2,000 | 1.8 |
| Colombia . . | 10,000 | Nil | 40,000 | 2.5 |
| Peru. . . | ? | ? | ? | 0.17 |
| Chile . . | 2,116 | ? | 2,116 | 1.0 |
| Argentina . . | 600 | ? | 600 | 0.34 |
| Brazil . . | 5,000 | Nil | 5,000 | 2.4 |

Mexico has small coal deposits of both bituminous and anthracitic varieties, but the deposits are far from each other, and in most cases distant from communications. The chief bituminous deposits occur in the states of Coahuila and Oaxaca; anthracite is found mainly in Sonora. Total production fluctuates considerably but is around 1½ million tons annually.

Of the South American countries, Colombia is the most generously endowed, with an estimated reserve of some 40,000 million tons. But the coal-mining industry is not very well developed, and the annual output is only about 2½ million tons. Moreover, the industry is inefficient and the cost is high. Peru is virtually lacking in coal, though a small amount comes from the Goyallarquisga mine near Cerro de Pasco and a little anthracite is mined at Huayday in northern Peru. Chile has one of the most highly developed mining industries in South America, and annual

production is about 1 million tons. Her reserves are reckoned at some 2000 million tons.

Argentina is poorly endowed with coal: total reserves amount only to approximately 600 million tons. The chief field is that of El Turbido in Santa Cruz; the deposits, however, are not very accessible and the coal is soft. Small quantities are also mined in Mendoza and San Juan. Total annual production amounts to only 340,000 tons.

Almost all the coal found in Brazil occurs in the south-east, in Río Grande do Sul and Santa Catarina. All told, just over 2 million tons are mined each year, but the coal is of poor quality.

PETROLEUM

It is calculated that Latin America produces 20% of the total world production of petroleum—more than 3 million barrels of oil daily. The bulk of this oil—some 75%—comes from Venezuela, where daily production figures are some 2½ million barrels. The remainder is scattered through ten other Latin American countries, some of them, such as Mexico, Trinidad, and Peru, oil producers for many years.

Petroleum occurs only in sedimentary rocks, hence there are large areas—especially the eastern plateaus—where there is no hope of finding oil. The Caribbean area is one of the world's great oil-resource regions. While Venezuela has the lion's share of the oil, Mexico, Colombia, and Trinidad also share in the area's oil wealth. Apart from the discovery of oil in Costa Rica, no commercially exploitable oil has been found in the Central American republics. In the West Indies, Cuba and Trinidad alone, so far, have discovered oil. Small reserves are found along the Ecuadorean-Peruvian coast. Recently oil has been located in the extreme southern tip of Chile—in Tierra del Fuego. East of the Andes petroleum occurs in Argentina, in Bolivia, and in Peru. In Brazil oil is exploited in the state of Bahía, in the north-eastern shoulder, and at Nova Olinda, in the heart of the Amazon basin. Greater or smaller quantities of petroleum occur in all the South American republics excepting Uruguay and Paraguay (where, however, prospecting is now going on and where there is reasonable hope of success) and the three Guiana colonies.

Venezuela is the outstanding producer, ranking second in the world. But at the present rate of extraction Venezuelan reserves will last only for another generation—unless fresh discoveries are made. There are already signs that certain of the South American oilfields, notably the Pacific coastal fields of Ecuador and Peru, are approaching exhaustion. Because of increasing oil consumption in the Latin American countries, the limited power resources, and the economic value of oil, widespread exploration for petroleum is taking place. In almost every country intensive oil-exploration programmes are being carried out, either by government agencies or the great oil companies. The discovery of oil in Costa Rica—the first find in Central America—has initiated a major search throughout this region, and the republics of Guatemala, Honduras, and Panamá, after

lying dormant for a number of years, are now taking a second look at their territories. Considerable exploration is taking place in South America, especially in the selva areas of Peru, Bolivia, and Brazil, and in Paraguay and Argentina; so far, however, the results have been disappointing, and no really rich strike has been made.

TABLE VIII
Petroleum

| Country | Reserves (proved barrels 1000's) | Wells (approx. no. producing) | Production (1000 barrels 1963) | Refineries (No. operat- ing) |
|-------------|--|-------------------------------------|--------------------------------------|------------------------------------|
| Argentina . | 2,400,000 | 5,401,000 | 110,000 | 16 |
| Bolivia . . | 125,000 | 128 | 3,280 | 4 |
| Brazil . . | 325,000 | 717 | 40,000 | 9 |
| Chile . . | 150,000 | 139 | 14,000 | 1 |
| Colombia . | 750,000 | 2,154 | 66,000 | 5 |
| Cuba . . | 1,000 | 63 | 144 | 6 |
| Ecuador . . | 30,000 | 1,683 | 2,480 | 3 |
| Mexico . . | 2,500,000 | 2,509 | 132,000 | 14 |
| Peru . . | 400,000 | 2,102 | 24,000 | 3 |
| Trinidad . | 475,000 | 3,217 | 56,000 | 3 |
| Venezuela . | 17,550,000 | 10,350 | 1,357,200 | 15 |

Table VIII shows the production of the Latin American producers and the oil reserves. Venezuela is the only large exporter of oil: so great is the Venezuela surplus that its petroleum exports alone account for nearly a quarter of *all* South American exports. Of the Latin American countries only Mexico, Trinidad, Colombia, Peru, and Bolivia are net exporters of oil, but as internal consumption increases so the exports decrease. Oil consumption is in fact mounting in every state—in some of them at the rate of 10% annually. Imports of petroleum result in a continually increasing drain upon available foreign currency. This situation has had a twofold effect: first, a more intensive search for oil, as already noted above, and, second, the setting up of petroleum refineries. Venezuela, for example, now refines about a third of her oil in her own refineries; Argentina has sixteen refineries in operation.

A point worth emphasising is that some Latin American countries, notably Mexico, Brazil, and Argentina, have clung jealously to the industry and excluded foreign oil companies. In Mexico, for instance, the oil industry was nationalised and all foreign oil interests expropriated. To-day, drilling, production, refining, and distributing is the monopoly of *Petroleos Mexicanos* (Pemex), a government department. In Brazil the industry is controlled by *Petrobras*. Such attitudes, however, have severely handicapped the industry. The Latin American countries, generally speaking, have not the capital necessary for large-scale operations, hence the search for oil and its production lags behind consumption. Venezuela has not withheld concessions to foreign companies and, accordingly, the oil resources have been fully exploited and Venezuela has reaped the profits.

NATURAL GAS

While natural gas occurs sometimes independently of petroleum, it is frequently associated with oil deposits. The relationship between petroleum and natural gas is close, and the major oil and gas fields are continuous; even so, it should be noted that many gas fields occur outside specific oil-bearing areas. The production and use of natural gas has a long history in the United States, but elsewhere in the world its development is very recent. Natural gas, like petroleum, is an elusive fuel, and very few countries have discovered and enjoy the benefits of gas.

Development of natural-gas resources has proceeded further in Latin America than in any other part of the world with the exception of the United States and the Soviet Union. Development has been greatest in Mexico, Venezuela, and Argentina. In 1965 production in Mexico was 13,965 million cubic metres. All told, something like the equivalent of 20 million tons of coal is being produced in Latin America.

In Mexico a gas pipeline runs from the Tampico-Tuxpan petroleum producing area to Mexico City; another pipeline network in the northeast is fed from the oilfield in that area. Plans have already been laid for a great extension of the pipeline network. Of all the Latin American countries, Mexico has most fully developed its abundant natural gas resources. In Venezuela there are two gas pipelines: one runs from the Piragua oilfield in eastern Venezuela to Caracas, the capital; the other from the La Paz oilfield in the Maracaibo area to Punta Carbon. In Argentina gas is piped from the Comodoro Rivadavia oilfield in Patagonia to Buenos Aires, and from the oilfield at Campo Duran in the extreme north of the country to Buenos Aires. This latter 24-in. pipeline, completed in 1960, delivers nearly 250 million cu. ft of gas daily to the capital: this amount is approximately four times that received from Comodoro Rivadavia. In Chile's Tierra del Fuego a 19-mile line conveys gas to Manantiales.

WATER POWER

Estimates of the water-power potential of the various continents differ between authorities, but it may be said that Latin America possesses approximately 25% of the total world potential capacity. In view of the shortage of fuel resources in Latin America, it might be thought that the countries concerned would have made the maximum use of such hydro-electric power resources as they possess. The overall installed capacity, however, is meagre. One or two simple facts help to explain the paucity of water-power development: first, capital costs for dams and hydro plants are very heavy, and most of the countries are relatively poor and unable to afford the capital outlay; secondly, many of the water-power sites are inaccessible, and even if power plants were established at such sites the practical transmission of the electricity to consuming centres is not feasible at present; thirdly, until very recently many countries,

lacking industrial development, had little call for power: the sudden trend towards industrialisation has brought power difficulties.

Of the various Latin American countries Brazil has the largest hydro-electric power potential: with 25 million h.p., it ranks among the best-endowed countries in the world. Brazil, in 1963, had a total installed generating capacity of about 6 million kW; this amounted to about three-fifths of the total developed power in South America. Chile ranks second, with about 12 million h.p., of which just over 1 million kW have been developed, the largest proportion of developed reserves in South America. The resource lies mostly in central and southern Chile, where the Andean streams have an all-year-round flow. Mexico, with 8.5 million h.p., and Peru, with 6.4 million h.p., are also well endowed. Total installed capacity in 1963 was over 3 million kW in the former and 769,604 kW in the latter. Less handsomely endowed are Argentina, Bolivia, and Paraguay. Except in the east central part of the Brazilian Plateau, water-power development throughout Latin America has been generally small-scale and slow, but there are definite indications that a speed-up in hydro generation will take place during the next decade; many countries have plans for the more effective use of their water-power resources, and as international co-operation grows, great schemes, such as the Salto Grande Project (*see* p. 448), will doubtless be implemented.

INDUSTRY AND MANUFACTURE

Perhaps the most significant feature in the economic life of Latin America during recent decades has been the development of manufacturing industry. Domestic and craft industries have, of course, long existed; so, too, has the preliminary processing of raw materials, but the appearance of large-scale factory industry and manufacturing plant is something that is relatively new in the more advanced countries and quite new in other countries. The growth of manufacturing industry is, however, proceeding rapidly, and the traditional agrarian system is being substantially modified, at least in certain areas. As recently as 1942 Professor R. S. Platt could write: "Manufacturing, in the modern sense of centralized mechanized processing, is alien to Latin America."★ Today this statement would have to be modified. While manufacturing in this sense is certainly new and still localised, it has nevertheless made its debut. The reasons for industrialisation and the growth of industry in Latin America, as well as the character of the industry, need some explanation. Let us look briefly at these three aspects.

REASONS FOR INDUSTRIALISATION

During the nineteenth century and up to the First World War the economy of Latin America was essentially one based upon the exploita-

★ *Latin America*, copyright 1942, McGraw-Hill Book Co. Ltd. P. 511.

tion of natural products, *e.g.* metals, nitrate, timber, and rubber, and the production of foodstuffs, *e.g.* meat, wheat, and coffee, for export. During the past fifty years there has been a swing towards industrialisation which has become increasingly accelerated. What are the reasons for this change in economic policy?

The First World War, 1914-18, cut Latin America off from European supplies of manufactured goods, and this led many of the countries to make for themselves what they could not buy abroad. Thus industrial development may be said to have begun seriously, at least in a few countries, at this time and to have arisen, partially at all events, out of the shortages created by the war. The Second World War, 1939-45, assisted further this shift towards industrialism; this was especially the case in Brazil, Argentina, Chile, and Mexico, countries which were already fairly well developed economically, but it affected also many of the smaller republics, such as Uruguay, Peru, Colombia, and Venezuela, which previously had had very little industry.

A second factor promoting industrialisation was the world economic depression of 1929-33. The collapse in prices in both farming and mining products dealt a severe blow to the Latin American countries, especially since many of them were virtually dependent upon a single commodity—perhaps coffee or sugar or meat or bananas or tin—for their economic prosperity. The depression provided a salutary lesson: in future there was to be no more, or at least less, dependence upon a single export staple. Diversification of the national economies became a watchword.

Again, the simple exchange of primary products for foreign manufactured articles, which, in general, was characteristic of the Latin American countries during the inter-war period, savoured too much of the “colonial” stage of development. Psychological motives of this kind helped to further the process of industrialisation. The supreme example is provided by Argentina. Under the Perón regime the traditional pattern of Argentina’s economy was completely upset by over-ambitious industrial expansion designed to make the country “independent” and politically strong.

Industrialisation offers one way of absorbing excess population. While few countries may yet claim to be over-populated, governments are looking to industry to provide employment for their rapidly expanding populations, *e.g.* Mexico. They also see in industrialisation a means of raising the low standard of living. “It is necessary,” says James, “to promote the movement of people away from the rural areas and into the cities where not only are new economic opportunities offered, but where a real attack on illiteracy, ill-health, inadequate diet, and the spirit of hopelessness can be made.”*

THE GROWTH OF INDUSTRY

While the growth of manufacturing industries was stimulated by the shortage of manufactured goods during the two great wars and by

* *The Changing World*. Ed. MOODIE and EAST. Geo. Harrap. 1956. P. 919.

national desires for greater economic diversification, economic security, and self-sufficiency, such growth is related ultimately to two conditions: the bases for industrialisation and the political climate.

First, what are the bases for industrialisation? It is not easy to generalise for a whole continent, but, broadly speaking, it may be said that the Latin American countries possess a fairly wide variety of raw materials for manufacture—cotton, wool, hides, timber and other forest products, vegetable fibres, and many minerals, including iron ore. Water-power, petroleum, and natural-gas resources are abundant in some countries, but developed electric power is insufficient to meet demands. The greatest drawback, however, is the lack of coal, which is still the fundamental base for most heavy industry. Such small supplies of coal as Latin America possesses are also poor in quality. From the human point of view industrial technique and know-how are lacking, though these are gradually being overcome by the training of managers, scientists, technologists, and technicians and the import of foreign-trained personnel. Furthermore, domestic markets are limited because of the size of the internal market and the general poverty of the majority of the people, while the external markets are very limited. But, in spite of the drawbacks, industrialisation is going ahead at a rapid pace in many countries.

Secondly, political conditions and considerations may strongly affect industrialisation. The growth of nationalism and the determination not to submit to "foreign economic imperialism" has led to: (a) an all-out drive to foster industrial manufacture so as to make the republics "independent"; (b) a deliberate attempt to diversify national economies and to aim at national self-sufficiency; (c) the imposition of tariffs and import restrictions to protect and stimulate industry; (d) the expropriation of foreign holdings and the withholding of concessions to foreigners; and (e) a refusal in some cases to accept foreign aid, for fear there may be "strings" attached to it, or to permit foreign investment. Though conditions and policies vary between country and country, and though modifications in policies may occur from time to time, the above features may be said to reflect, in general, the attitude of the Latin American countries.

Only Brazil, Argentina, Chile, and Mexico may claim to be appreciably industrialised, although Uruguay, El Salvador, and Costa Rica have developed considerable manufactures. Uruguay offers an outstanding example of the rate at which industrialisation is progressing: twenty-five years ago she had no industries to speak of; today 75% of the manufactured goods sold in the domestic market are home produced. The contagion is widespread, however, and Peru, Ecuador, Colombia, Venezuela, and Cuba are all undertaking programmes of industrial development.

THE CHARACTER OF THE INDUSTRY

As regards the character of Latin American industry two main points may be touched upon: the kind of industrial manufacture undertaken and the size and organisation of industrial establishments.

"The industries at present operating can be put into two classes," says Sir Ronald Fraser,* "those that have sound reason for their existence and those whose life is artificial. Among the first are those that use native materials obtainable at good prices and those that are necessary even if the materials have to be imported. In the second class are those that were established during curtailment of imports, industries for which the alternatives are protection or extinction: they rely on imported materials that are often costly, on local materials that are produced uneconomically; and they produce an article that is poorer and dearer than the imported article would be." Generally speaking, the food- and grain-processing industries, textiles, leather, footwear fall into the first group; iron and steel goods, engineering products, ships, motor cars fall into the second.

Classifying industries in an alternative fashion, a three-fold grouping may be made: (1) manufactures based upon the preparation and processing of forest products and farm products, such as quebracho extraction, vegetable-oil pressing, sugar refining, meat canning, flour milling, etc.; (2) light industries producing consumer goods which use local raw materials, e.g. textiles, footwear, brewing, cigarettes, soap, ceramics, and furniture; and (3) heavy industry, such as iron and steel and oil cracking, which is still only feebly developed but undergoing considerable expansion. To these might be added a fourth group: the domestic and craft manufactures, which are widespread and whose total production is still great; among such industries and manufactures are silver-smithing, leather-work, wood-carving, blanket-weaving, pottery, basketry, needlework, etc.

Industrial production varies from domestic handicrafts in Indian communities to large-scale mechanised factory production. Factories, however, tend to be small and to employ relatively few operatives; they tend to be concentrated in a few large industrial centres; and factories concerned with manufacturing as distinct from processing goods cater predominantly for the home market. In comparison with the industrial productivity of the United States or Western Europe that of Latin America is still very small.

AN ECONOMIC DILEMMA

In connection with Latin American industrialisation two diverse points of view exist. One viewpoint is that since the Latin American countries in general cannot hope to compete with the older-established industrial countries and are deficient in basic power resources they would be wise to continue principally as suppliers of foodstuffs and raw materials which their pastures and farms, forests and mines have in the past provided and yielded profitable returns. But such a policy does not commend itself to the nationalistic countries of Latin America. The other viewpoint is that an economy based mainly upon the production of foodstuffs and industrial

* *Latin America*. 1953. Pp. 202-3.

raw materials is likely to place the Latin American republics in a position of economic servitude and political inferiority. It is a policy redolent of colonialism, and on that account unacceptable to them. The best solution probably lies midway between these two economic policies of a raw-materials economy and industrialisation.

The validity of an "intermediate economy" is illustrated by the case of Argentina. For a century Argentina's economy was based upon the commodities produced on her farmlands—principally meat, wheat, linseed oil, and wool. Although her sources of power were small and her industrial raw materials only moderate, she embarked in the 1940s upon an over-ambitious programme of industrialisation; moreover, to attain this she deliberately neglected her agriculture. As a result of her excessive ambitions, a steady deterioration in the economy set in which had political repercussions bringing about the downfall of the Perón regime. The tendency during recent years has been to abandon the policy of industrialisation-at-all-costs and manufacturing self-sufficiency and to revert to the expansion and improvement of agriculture, placing greater stress upon the output of farm products and raw materials for export.

It seems likely that if economic prosperity is to be achieved and the standard of living raised a balance must be aimed at between a purely raw-materials economy and industrialisation.

TRANSPORT AND COMMUNICATIONS

Transport and communications play an important role in economic, social, and political conditions and developments. Natural resources cannot be exploited nor the products of field, forest, or mine distributed without means and methods of transport. Many parts of Latin America, often potentially rich, remain economic deserts simply through a basic lack of transport and communications: the *montaña* or forested Andean slopes and plains of the Andean republics, for example, have remained under-populated, inaccessible, and economically unproductive areas on this account. Even where means of transportation are available, "the play of considerations other than practical as regards labour and personnel, the conflict of interests between the roads and the railways, obsolescence, the want of co-ordination between the different means of transport, make the movement of goods, especially when there is a defective system of storage as well, slow and hazardous."*

The population pattern tends to be one of isolated clusters which are usually inadequately linked to each other by communications. Their outlets usually focus on the nearest river or seaport. "The isolation of cluster from cluster, though it is now being modified by air services and the radio, has had its effects both politically and economically. It is to this factor (coupled with racial diversity and great variations in the standard of living and education within the social groups which comprise the cluster), that

* FRASER, SIR RONALD. *Latin America*. London. 1953. Pp. 171-2.

one should look for an explanation of the continued dominance of the political leader and for the slow fusion of the whole population. Economically, the cluster pattern has led to a greater conservatism in traditional methods of mining and agriculture than would otherwise have been the case."* The absence of communications or the very tenuous links between the provinces or regions of a country as, for example, in the case of Colombia, Ecuador, and Brazil, has militated against the development of national consciousness; regionalism and provincialism have flourished at the expense of national cohesion and unity.

Four main phases in the history of Latin American communication may be distinguished. In the early period—the Colonial Era—communication was by river-boat and pack-horse; in some areas these modes of transport still persist. Between about 1870 and 1914 railways began to be built in certain areas, and the railway networks of the Pampas region, south-eastern Brazil, and central Chile were commenced. This was the railroad era, and, though some lines have been laid since, the principal lineaments of the railway pattern were moulded at this time. During the inter-war years the aircraft appeared as a means of communication and very rapidly became a popular medium of transport, so that Latin America came to possess a remarkably well-developed network of airways. While air transport continues to expand, the post-war period (since 1945) has been marked by a great road-building programme, epitomised in the Pan-American Highway. But, in spite of these varying developments, "the primary network is incomplete, inefficient and expensive."†

INLAND WATERWAYS

Excluding the Río Grande, which forms the boundary between Mexico and the United States, Latin America has five great systems of drainage: the Magdalena, the Orinoco, the Amazon, the São Francisco, and the Paraná-Plata complex. Superficial acquaintance with these great river lines suggests they afford a magnificent means of communication within the continent. Historically, they did provide a means of ingress to the interior. Each is navigable for long stretches, if not in its entirety. But, viewing the rivers as a whole, they are by no means as useful as they appear, since many of the tributaries, and sometimes the main streams, are broken by rapids or falls, while their navigability is uncertain in some cases owing to alternate seasonal flooding and low water. Moreover, they have, in general, the big disadvantage that they drain areas that are thinly peopled and unimportant economically.

In Colombia the Magdalena and, to a lesser extent, its tributary, the Cauca, have for long served as the life-lines of the country, linking the highlands, where most of the people live, to the Caribbean lowlands and the ports which act as the outlets for the products of the interior. Unfortunately, the Magdalena is broken by several rapids, and its lower

* *The South American Handbook*. 1960. P. 12.

† FRASER, *op. cit.*, p. 171.

course is very susceptible to silting; however, railways connect the navigable stretches so that there is a through line of communications and the river is able to carry considerable quantities of traffic. The Orinoco suffers from low water during the dry season, hence its usefulness is limited, though this is a matter of little account, since its basin is, as yet, virtually undeveloped. The exploitation of the iron-ore deposits at El Pa and Cerro Bolívar has led to the dredging of the lower Orinoco, and ocean-going vessels are able to reach Ciudad Bolívar 270 miles upstream. It is estimated that the Orinoco and its tributaries offer some 6000 miles of navigable waterways; these may prove to be of value when the llanos region becomes opened up.

The Amazon and its tributaries offer during the flood season some 36,000 miles of navigable waterways. Ocean-going vessels can reach Manaus, 1000 miles upstream, while river steamers ascend the river as far as Iquitos, in Peru, which is 2300 miles from the Atlantic. During the high-water season many of the tributaries are passable, but at other times of the year river craft must be man-hauled around the rapids. Traffic on the Amazon system is light, however, because of the sparseness of the population and the limited production of the basin.

The few rivers which flow eastwards from the Brazilian Escarpment towards the Atlantic are swift and turbulent and unnavigable. Many of the streams flow towards the interior, and in the central section join the São Francisco, which drains a large segment of the Brazilian Plateau. This great river, which appears to offer an easy way into the plateau interior, is interrupted by the Paulo Affonso rapids in its lower reaches, but is navigable over a long distance in its middle section. A short railway circumvents the Paulo Affonso rapids so that an outlet is provided to the sea.

The Río de la Plata complex is the most important river system in the whole of South America from the point of view of its economic value. The highly productive lands surrounding the la Plata estuary are readily accessible by water highways. Of the various streams of the la Plata system, the Paraná is navigable for ocean freighters as far as Santa Fé, approximately 150 miles upstream, and for river steamers up to Asunción, in Paraguay, 850 miles upstream, while the Río Uruguay is navigable to Salto where rapids obstruct further passage.

With canal linkages, short-circuits, river control, and dredging, the great rivers of South America could be integrated into a magnificent system of interior waterways. In 1941, at a conference in Montevideo, suggestions were put forward that the countries concerned should study plans for the connecting up of the Orinoco–Amazon–Plate systems. The project was discussed subsequently at a Pan-American conference of engineers which urged the governments of the states that would be affected to reconsider the possibilities of such a scheme. The project is vast in its scale, but by no means impracticable. Certainly the realisation of any such scheme would help to open up large continental areas still

comparatively isolated and inaccessible. Any project would be an economic liability for many, many years, but, from the long-term point of view might well prove to be very worthwhile, for until transport facilities become available the interior regions, frequently potentially rich, will remain negative areas.

The west-coast rivers are invariably short, swift-flowing, and unnavigable: almost the only exception is the Guayas-Daule system in Ecuador. Furthermore, the river outlets do not usually offer harbour facilities for ocean-going vessels, and ships are frequently compelled to anchor in open roadsteads, as in the case of Iquique and Antofagasta, the goods being transferred to the shore, or vice versa, by lighter or other small craft.

Lake-traffic plays a small role in the general pattern of communications. There are boat services (small lake steamers and launches) on some of the lakes of Central America, on Lake Titicaca, connecting Peru and Bolivia, and on the larger lakes of southern Chile and southern Argentina.

RAILWAYS

Generally speaking, railway construction was a late development in Latin America and was dependent in the main upon foreign capital. Railways originated in much the same way and for much the same purposes as did most of those in the "newer lands," i.e. as single isolated lines penetrating inland from ports for which they acted as feeders, carrying the produce and resources of newly opened-up areas to the coast for export. Since this economic exploitation and railway building were undertaken chiefly by foreigners, there was never any attempt to secure uniformity of gauge: each line was built on the gauge customary to the foreign management; hence, within Latin America, there is a multiplicity of gauges. There are some 81,500 miles of railway with an absurd variety of gauges: 5 ft. 6 in., 5 ft. 3 in., 4 ft. 8½ in., 3 ft. 6 in., metre, 3 ft., 2 ft. 6 in., 2 ft. 5½ in., and 2 ft. The greatest mileages are on the metre, 4 ft. 8½ in., and 5 ft. 6 in. gauges.* Not merely do the gauges vary between country and country making national link-ups difficult, but gauges differ within each state; for example, in Venezuela there are five different gauges in existence, in Colombia three. In the past, however, because of the isolated character of many of the lines and the lack of inter-regional contacts and trade, this confusion of gauges has not been the handicap that one might suppose; the problem has been most acute in Argentina and, to a smaller degree, in Uruguay and Mexico. With the growing desire for, on the one hand, greater internal national cohesion and unity and, on the other, a greater measure of inter-regional trade and economic association, the several states have discovered that break of gauge is a limiting and undesirable factor. In many countries, as, for instance, Argentina, Brazil, and Mexico, conversion of gauge is being undertaken; in most other republics it is being contemplated.

* A. C. O'Dell, *Railways and Geography*. Hutchinson. 1956. P. 127.

In few parts of the world is railway construction faced with such tremendous physical difficulties as in Latin America. The railways represent, wrote Fraser, "an extraordinary effort of skill and courage on the part of those, often foreigners, who planned, made and financed them."* High mountains, with steep slopes and often deeply dissected by rivers, and vast areas of forest, laced with numerous streams and marshy in places, present formidable difficulties. A few examples will demonstrate the problems frequently involved: a 576-mile stretch of railway in Venezuela requires more than 700 bridges; the Guayaquil-Quito railway in Ecuador climbs to a height of 10,626 ft in 50 miles; the Peruvian line running from Callao to Oroya has 67 tunnels, 62 bridges, and 11 zig-zags and climbs to a height of 15,665 ft; the Santos-São Paulo line tunnels and winds its way up the 2600-ft escarpment of the Serra do Mar by cable; and the Leopoldina Railway climbing the same escarpment has "the steepest ascent by adhesion of any steam railway in the world."† The railways of the Argentine pampa, in contrast, were simple and easy and cheap to build because of the level terrain, but these provide one of the few exceptions to the general rule that railway building is more than ordinarily difficult in Latin America.

Latin America is adequately served by railways in only a few areas. Two regions only may be said to be served by railway networks comparable to those found in either Western Europe or the eastern half of the United States: these are the Pampa Region of Argentina and the state of São Paulo in Brazil. The most complete network occurs in the pampa, where lines radiate out fanwise (with inter-communicating links) from the ports of Buenos Aires, Rosario, Santa Fé, and Bahía Blanca. The main lines extend beyond the Pampa Region to provide international connections with Brazil, Uruguay, Paraguay, and Bolivia and, via the Trans-Andine railway, with Chile. A much less elaborate network serves the Coffee Region of Brazil: about 75% of the total railway mileage is found here in the states of São Paulo and Minas Geraes. Brazil has no railway links with Venezuela, Colombia, Ecuador, or Peru, but she has recently established connections with Bolivia. Two other countries, Chile and Mexico, may claim to have reasonably well-developed networks. In Chile a system on a trellis pattern is found, while in Mexico there is a radial pattern focusing upon Mexico City.

Outside these principal regional networks, railways are characteristically short, isolated lines penetrating inland to reach a productive agricultural pocket or to tap a mining area. Trans-continental lines are few, though efforts are being made to provide inter-regional link-ups.

A problem that is taxing most Latin American countries is railway maintenance. Although many of the republics owned some of the railways in their respective countries, many lines were owned and managed by foreign companies. During recent years Argentina, Uruguay, Brazil, and Mexico have bought out foreign interests. Such countries are now

* *Latin America*. P. 172.

† *Idem*.

faced with the financial burden, hitherto shouldered by foreign concerns, of replacing, renovating, and repairing the track and the rolling stock, in addition to meeting the demands for better services and extensions to the system. In Brazil, for example, the Abbink report stated that the railways were "desperately in need of reconstruction and re-equipment";* moreover, only three out of the twenty-nine companies run at a profit. Again, in Ecuador, the burden of railway management has become so onerous that the republic has invited private enterprise, once again, to take over the railways.

ROADS

In the introduction to this section on communications it was suggested that four phases could be distinguished and that chronologically road-building came last. Roads of a kind have, of course, a long history and antedated the railways, but the past decade or so has seen a great extension of road-building and, more especially, the spread of the Pan-American Highway. In this sense the most rapid and spectacular progress in road construction has followed the establishment of airway communications.

Although we are concerned with the development of roads during the recent past, it might be mentioned in passing that the Incas were great road-builders, and their Empire was linked together by a number of great highways. From early Colonial times a number of trails, such as the one leading from the Andean plateau of Peru via the oasis settlements of north-western Argentina to Buenos Aires, were established. For long such trails, travelled by pack animals, or cart roads were the only highways. Metalled motor roads are essentially a modern development.

In one or two countries only can there be said to be adequate highway networks, and even in these countries, such as Argentina and Mexico, there are extensive areas ill-served with roads. In Latin America as a whole, highway development is very unequal. With the growing importance of the motor car and the lorry for private and commercial use roads have taken precedence over the railways, although, as with the latter, road construction faces many and serious difficulties as a result of the physical conditions. Road-building is difficult in the Argentine pampa, since there is no gravel or stone readily available for surfacing; hence, outside the immediate environs of the towns metalled roads do not normally exist. Roads in the rural areas are quagmires and virtually impassable in wet weather and hard, rutted, and dusty in dry.

Brazil has 292,000 miles of road, but, apart from the network in the south-east which accounts for nearly 75% of the total mileage, the roads are primitive. Less than a quarter of the highway mileage may be described as improved roadway. In the Andean republics the terrain does not facilitate road-building, and large areas are roadless. In Colombia, for instance, it is often easier, if not always necessary, to travel from place to place by mule. Few roads have penetrated the montaña or forested slopes

* *The South American Handbook*. 1960. P. 213.

and plains that lie east of the Andean sierras: those that do have to struggle against dense forest, deep stream valleys, steep slopes, and frequent landslides. By and large, not only are roads expensive to lay but costly to maintain also in most parts of Latin America.

The Pan-American Highway. This is an imaginative project designed to link together all the countries of North and South America. Ultimately, when the road is completed, a continuous highway, some 20,000 miles in length, will run from Alaska to Argentina. The 3000-mile section running from the Texas-Mexican frontier to Panamá City is sometimes called the Inter-American Highway. The work of construction in this Central American section was greatly speeded up during the Second World War, mainly as a result of United States aid, and by 1951 just over 90% of the highway had been completed and was being used, although one-third of the mileage was not metalled. Progress in building eased off during the 'fifties, and in 1957, when a conference of engineers and officials met in Panamá City to discuss the completion of the Inter-American section, two breaks in the highway still remained: these were a 30-mile gap between Mexico and Guatemala and a 200-mile gap in Costa Rica south of San José. The United States, in 1955, promised to pay two-thirds of the cost for the closing of these gaps and also offered to lend the republics concerned the remaining third. As a result, the two breaches have been closed.

At the Panamá City Conference hopes were expressed that the Pan-American Highway as a whole might be completed in the near future. Most of the South American republics have completed their sections in part—one or two in their entirety—but viewing the highway as a whole, there are still major gaps and, indeed, much of what has been done is far from being high-class, all-weather road. The Panamanian Government wishes to build the 500-mile stretch of road between Chepo in Panamá and Medellín in Colombia. Engineers who have surveyed the route—a formidable and difficult stretch of mountainous terrain and jungle—estimate the road could be built in five years at a cost of \$100 million. But without United States help Panamá is unable to finance the project, and it is doubtful whether the United States would be willing to meet the expense, or even part of it, since the stretch of road in question lies south of the Canal Zone.

In Colombia the Pan-American Highway runs southwards from Medellín to Ipiales near the frontier with Ecuador. It then continues southwards through Ecuador as far as Loja, where there is a gap of some 50 miles until the Peruvian boundary is reached. In Peru the Highway runs north-south through the coastal belt as far as the port of Camana, where it swings inland and then divides, one branch running eastwards into the highlands as far as Puno on Lake Titicaca, whence it turns southwards, skirting the lake, to Desaguadero on the Bolivian boundary; the other branch runs southwards to the frontier of northern Chile. In Chile the longitudinal Highway, which runs from Arica as far as Llay-Llay, is obviously of national significance, linking as it does the northern extremity with the

core area of the state. At Llay-Llay a short branch leads southwards to Santiago, while another branch goes eastwards via the Uspallata Pass to Mendoza in Argentina.

The usefulness of the Pan-American Highway is twofold: it provides, or at least will provide when it is complete, a continental and inter-continental throughway, and it is helping to break the economic isolation of many of the Latin American Republics which hitherto had no overland links with one another.

AIRWAYS

The First World War fostered the development of aircraft, and during the inter-war period (1918-39) the threads of an airways network began to form a definite pattern. The Second World War brought a further impetus. Air transport, initially used for passenger traffic and valued because of the speed, a time-saving factor, has now wider possibilities. Not only is air transport being used for commercial purposes—the carrying of freight—but air services are also of vital importance from the political and social point of view. Aircraft are now being used to open up Brazil: the new town of Goiânia, for example, was literally built from the air, while the development of the so-called Great Diagonal (*see* p. 411) is based essentially upon air services. The isolated provinces of Colombia are being linked together by air, thus helping to create national unity. Contacts between the different members of the West Indian Confederation will depend very much upon air links.

At the same time aircraft are being widely and increasingly used for commercial transport. Fish from the coast is now being flown to inland centres, cattle from the Guiana savannas to the coast, while even commodities such as metalliferous ores, petroleum, and timber have been exported by air from newly developed areas. Carriage by air is costly, however, and the possibilities of using air transport for merchandise must inevitably be of a limited nature. As Fraser has suggested,* perhaps the greatest benefit that will accrue from air transport will be the closer human contacts engendered between province and province and country and country and in the spread and cross-fertilisation of ideas.

A number of factors or considerations, chiefly the difficult physical conditions, the great distances between population clusters, and the lack of other means of transportation, have encouraged the growth of air services in Latin America. Expansion was greatly helped by the circumstances of the Second World War. The United States, which had acquired and developed air bases in Latin America during the war, handed the airfields over on the cessation of hostilities and these were adapted to civilian use; numerous personnel who had been trained as pilots, navigators, and engineers became available for the civilian air services; surplus machines and equipment no longer needed once the war was over were acquired

* *Op. cit.*, p. 179.

cheaply; meteorological stations which had been established and weather-forecast services were taken over; and many people had become air-minded. Moreover, many astute-minded people saw the possibilities which air services could provide in a continent where overland transport was severely handicapped and communications but poorly developed.

TRADE

Three important facts stand out with respect to Latin American trade: (i) exports consist almost exclusively of foodstuffs, raw materials, and minerals while imports are primarily manufactured goods; (ii) trade exchange between the various individual countries is very limited in its extent; and (iii) the trade from Middle America is mainly with the United States, whereas that from temperate South America is mostly with Western Europe.

The Latin American economy generally is still dominated by primary production, and although industrial manufacture is steadily growing, it has not yet begun seriously to transform the economic basis of the region. Hence primary produce—cereals, beverages, sugar, fruit, meat, wool, hides, metals, and petroleum—continues to dominate the export trade.

Inter-state trade is restricted largely because the various countries are mainly producers of primary products and they frequently produce the same commodities. One would have expected, however, a considerable measure of interchange between the tropical and temperate parts of Latin America, since these areas clearly produce differing commodities; but there is, in fact, little interchange. A few examples will demonstrate the paucity of inter-regional trade. Not much more than 10% of Argentina's exports go to Brazil and Chile, her near neighbours and best customers. Bolivia, too, notwithstanding the fact that it is a land-locked state, exports only 10% of its products to other Latin American countries. Venezuela's imports from other Latin American states are negligible, while its oil exports to Latin American countries amount to about 10% of its total oil export trade. The Latin American Free Trade Association is likely to stimulate a greater measure of inter-regional trade, but it is unlikely that it will change the present picture to any appreciable extent.

The United States and Western Europe between them dominate Latin American trade and are likely to continue to do so, since their economies are largely complementary. To quote an example: 45% of Bolivia's exports (mainly tin) go to the United Kingdom and 35% to the United States, while 45% of Bolivia's imports come from the United States. The trade of Mexico and the Central American Republics is mostly with the United States.



[Courtesy: Pan American Union.]

Monterrey, Mexico. Interior of a lead mill.

Chapter IV

POLITICAL GEOGRAPHY

THE POLITICAL PATTERN

HOWEVER useful and helpful natural regions are in the study of the land areas, political units are fundamental geographical realities of which the geographer must take due cognisance. Indeed, these days, perhaps more so than ever before, the political unit is of supreme importance and the geographer ignores it at his peril. Nationalism, which first emerged in Europe in the fifteenth and sixteenth centuries and received a tremendous impulse as a result of the French Revolution, spread throughout Europe and the Americas in the nineteenth century. In the present century the infection has spread to Asia and Africa.

The political pattern in Latin America is the outcome of European colonising activity and subsequent national movements. The latter had much success but were not able entirely to liquidate colonialism. The result is that colonial remnants are still to be found in Latin America. But, in the main, Latin America is an area of sovereign states, gigantic and pygmy in size, all now well established and very conscious of their sovereignty. Partly for this reason, the treatment of the Latin American area followed in this book is by countries rather than by major regions—although each political unit is broken down and studied on a regional basis. Treatment by regions is a more mature approach, but is also more difficult. For the beginner interested in the geography of Latin America country-by-country study is to be preferred.

In this chapter, which is concerned only with the broad aspects of the political geography of Latin America, attention will be directed first, to the historical growth of the present-day political pattern, secondly, to certain geo-political aspects, and thirdly, to some of the more important political problems.*

THE COLONIAL PERIOD

The exploration and conquest of Latin America were carried out principally by the Spaniards and the Portuguese, though it should not be forgotten that Danes and Dutch and French and British also sought and acquired territories in the region. South America came to be a near-Iberian monopoly, and the colonial efforts of the other European powers were confined chiefly to the West Indian islands and the Guiana

* For this chapter I am greatly indebted to Lewis M. Alexander's *World Political Patterns*, Rand, McNally & Co., 1963, pp. 171–205, and *The Changing World*, edited W. G. East & A. E. Moodie, Harrap, 1956, pp. 860–942 and 960–1003.

coastlands. European endeavour was stimulated partly by the lure of precious metals and partly by such sought-after tropical commodities as sugar, cotton, tobacco, and dyewoods which were procurable in the region.

One of the most interesting features of Latin America's colonial development is the division that was made allocating Spanish and Portuguese spheres of influence. These spheres were laid down first by the Papal Line of Demarcation (1493) and second by the Treaty of Tordesillas (1494) between Spain and Portugal. The treaty effected a revision in Portugal's favour and reserved to her the great shoulder of South America east of the mouth of the Amazon. This division of South America between Spain and Portugal was to have important results: it meant that henceforth there were two traditions in South America, one Spanish, the other Portuguese, traditions still apparent in the linguistic differences between different parts of the continent. It meant further that while the Spanish Empire broke up, giving rise to a number of new states, the Portuguese Empire in South America remained intact and now forms the United States of Brazil politically separate, however, from Portugal. There were other differences too, *e.g.* in land-holding, economic development, which distinguish the two areas.

Latin America was held as colonial territory by the two Iberian powers for some three hundred years. The territories, both Spanish and Portuguese, belonged in their entirety to their respective sovereigns, who ruled, regulated, and taxed the people according to their whims. Power ultimately became delegated to Viceroy. Although the first Spanish Viceroy, Mendoza, was a wise, energetic, and interested servant of Charles V of Spain, founding more than 200 towns, setting up an elaborate system of law courts, and introducing European crops, animals, and methods of husbandry, his example was all too rarely followed by his successors. Ruthless exploitation of the resources of the colonies and oppression of the native inhabitants came to be the general characteristics of Spanish rule. To the Spaniards, the colonies were always, first and foremost, a source of bullion; colonisation and commerce were ever subordinate and of relatively little importance.

In the Portuguese dominions things were if not otherwise at least less ruthless and oppressive. Portuguese colonial policy was less rigid than that pursued by Spain. But there was also another great and fundamental difference. The great wealth of gold and silver which accrued to the Spaniards was not to be found in the Portuguese colonies, hence the Portuguese, instead of ransacking temples, found they had to till the soil or herd animals if they wished to live. Thus the Portuguese became good colonists and traders, as the Spaniards seldom did. Economic development became focused upon a series of commercial speculative undertakings—in sugar, gold, cotton, and coffee—which came to characterise the Brazilian economy and to exert a profound influence upon the political geography of the area.

INDEPENDENCE MOVEMENTS

The independence movements in Latin America during the early part of the nineteenth century were the outcome of many factors. High taxation and the rigid control of trade by the home governments was certainly one source of dissatisfaction. Another was the hatred existing between the creoles (Spaniards born in America) and the European-born Spaniards who held a monopoly of the official positions. The liberal ideas of the eighteenth-century philosophers also undoubtedly made an impact upon the more educated and intelligent creoles. The example, too, of the successful independence movement of the United States nourished the desire for freedom among the Latin American colonies.

The spark which lit the flame of revolt, however, was Napoleon's dethronement of King Ferdinand VII of Spain. The Spanish colonies refused to accept Joseph, Napoleon's brother, as King of Spain. The liberation movement began ostensibly with the object of restoring Ferdinand as king, but the governments formed in his name were quick to pronounce the colonies they represented free and independent republics. The support given by Great Britain, especially through her naval power, was invaluable in the struggle. A number of revolutionary leaders—José de San Martín in Argentina, Bernardo O'Higgins in Chile, and Simón Bolívar, who freed Venezuela, Colombia, Ecuador, and Bolivia—campaigns for freedom and were successful. In Mexico and Central America early independence movements began in 1810, but met with less success. In Mexico fighting continued for eleven years until Iturbide proclaimed the country's independence in 1821 and then proclaimed himself Emperor. Iturbide lasted only a year, a republican regime being established in 1824. By 1828 the whole of Spanish America was free.

It would be erroneous to imagine that at this time there was any real national consciousness. A few may have discerned and felt a nascent nationalism, and one or two thought in terms of a wide, all-embracing Latin American community. But for the majority a negative rather than a positive attitude prevailed. The urge for independence was largely local in character—to be free from paternalistic rule—and the random revolts may well have remained isolated uprisings but for San Martín and Bolívar, both men of vision, though utterly unlike in character. The ultimate leadership fell to Bolívar—perhaps not altogether for the good.

The lack of any strong national consciousness is illustrated by the cases of Gran Colombia and the Federation of Central America. As a result of Bolívar's victories in the north of South America the state of Gran Colombia, which comprised present-day Panamá, Colombia, Venezuela, and Ecuador, was set up in 1821. Its political existence was short-lived, however, for it broke up in 1830. Similarly, the Federation of Central America, comprising the present-day isthmian states, existed only for a short period (1824-38). "In each case centrifugal forces in the form of relief, differing histories, political leaders, and economic interests, were

eventually strong enough to break up the political units into separate parts.”* Political nationalism is more particularly a twentieth-century growth, and though now highly developed in some countries, such as Argentina, in others, such as Peru, it remains still very weak. As we shall see later, many factors militate against the development of a national sentiment in the Andean states.

Brazil's independence came about in a different fashion. When Napoleon invaded Portugal in 1807 the royal family fled to Brazil. Here they remained until 1821, when King John returned to Portugal. The king left his son, Dom Pedro, as Vice-Regent. When the king attempted to return Brazil to its former status as a colony Dom Pedro declared Brazil an independent kingdom and made himself Emperor of Brazil (1822). In 1832 Dom Pedro was compelled to abdicate. His son, Dom Pedro II, ruled from 1840 to 1889, a period of expansion and development when Brazil emerged as an important power. Dom Pedro's long reign and progressive rule was brought to an end by a military coup, and the country was declared a republic on 15th November 1889.

POLITICAL CHANGES SINCE INDEPENDENCE

We are not and cannot be concerned with the detailed histories of the several states of Latin America. Much of the history indeed makes very unsavoury reading, a tale of brutal dictatorship, civil war, and repetitive revolution. One is constantly surprised that Latin America did not succumb to complete chaos and political suicide. Yet, in spite of this political apoplexy, the political framework and the political organisation remained comparatively undisturbed.

Since the days of independence changes in the political pattern have been few. Changes in political status have affected only five states since 1838: in 1844 the Dominican Republic sought and achieved independence from Haitian control; in 1898, as a result of the Spanish-American War, the United States took over control of Cuba and Puerto Rico from Spain; in 1903 Panamá, with the connivance of the United States, seceded from Colombia and became an independent republic; while in 1917 the Danish possession of the Virgin Islands was sold to the United States. In 1962 Jamaica and Trinidad became independent states in the British Commonwealth; Guyana became independent in 1966 and Barbados in 1967.

Inter-state conflicts have been fewer than the disturbed political conditions might lead one to expect, and the number of territorial changes which have occurred during the past century and a quarter have been confined principally to one or two areas. The greatest territorial change came about through the nineteenth-century expansionism of the United States, which led to conflict with Mexico; this conflict resulted in the latter losing over 700,000 square miles of territory to the United States between 1836 and 1854. In the five-year war (1865-70) with Argentina, Brazil,

* ALEXANDER, LEWIS M. *World Political Patterns*. Rand, McNally & Co. 1963. P. 181.

and Uruguay the inland republic of Paraguay lost 55,000 square miles of its area. This disastrous and costly war was largely responsible for Paraguay's century-long stagnation.

A serious territorial dispute, involving Bolivia, Peru, and Chile, centred on the northern Atacama Desert. The ill-defined and unsettled boundaries plus the nitrate wealth of this area led to conflict between the three countries. In the War of the Pacific (1879-83) Chile conspired with Peru to attack Bolivia. Chile, possessing a navy, was successful. Not only did Bolivia lose its coastal province, becoming thereafter a land-locked state, but Chile also double-crossed her partner in crime and took the Tacna province. In addition to her Pacific loss, Bolivia also lost a slice of her eastern territory to Paraguay. Both Bolivia and Paraguay laid claims to the northern portion of the Gran Chaco, and treaties dividing the disputed territory were signed in 1879, 1887 and 1894 but never ratified. In 1932 war broke out between the two states, and a three-year conflict ensued which reduced them both to impoverishment and exhaustion. Finally, in 1938 the dispute was settled: Paraguay gained an additional 91,800 square miles of territory. Bolivia has been dogged by ill luck, and in a dispute with Brazil she was compelled to cede the Amazonian territory of Acre to Brazil (1903).

A number of other territorial changes have occurred, but these have been of a less serious nature and involved only minor adjustments.

THE PERMANENCE OF THE POLITICAL PATTERN

The relative stability of the political pattern of Latin America for well over a hundred years has been one of the outstanding features of the political geography of the area. Alexander has written: "The large number of national political units and the ability of these units to maintain their independence over long periods of time are in sharp contrast with the turbulent conditions of political control which have existed in many other parts of the world since the early nineteenth century. This stability of the political pattern has persisted in spite of the revolutions and changes of administration which take place frequently within the national governments in many of the Latin American states. It also has existed in seeming defiance of internal centrifugal forces brought on by the ethnic differences and scattered population patterns in many of the countries."*

What influences or factors can be adduced to explain this relative permanence in the political pattern? Perhaps six main factors have been responsible for, or at least have contributed to, this stability. (1) Most of the states possessed relatively small populations and relatively undeveloped economies, so that they had not the capacity in terms of either manpower or economic strength to indulge in long wars against each other. (2) The absence of concentrations of population or valuable resources in frontier areas lessened the possibilities of inter-state friction; indeed, for a long time portions of the state boundaries were undemarcated, since they

* *Op. cit.*, p. 179.

lay in no-man's-land. (3) The third factor is a corollary of the previous two: most states possessed as much territory as they could effectively control and populate, hence there has been little need for any territorial expansion to gain more "living space." (4) The disturbed internal political conditions in most states meant that rulers were usually fully preoccupied with their own security and seldom were in a position to risk external hostilities. (5) The Monroe Doctrine, proclaimed by the United States in 1823, and supported by Great Britain's naval might, effectively excluded European powers from the Western Hemisphere and prevented them from pursuing colonial activities in Latin America. (6) The development by the United States during the present century of a "Pax Americana" policy has helped to prevent inter-state disputes and rivalries from developing into armed conflicts.

Though, as we have already seen, Latin America was not immune from disputes and wars, these seldom wrought drastic territorial changes, thus the political framework of the region has shown a remarkable degree of permanence.

THE PATTERN OF GOVERNMENT

While the territorial patchwork has altered but little and the political map of today differs only in detail from that of a hundred and more years ago, internal political conditions do not exhibit the same stability. Latin America has been plagued by the weakness of governmental institutions.

Though chronic instability has been a characteristic of internal government, "there has been a fairly regular pattern in Latin American political behaviour."* This pattern has been one of recurring dictatorship. Bolívar himself prophesied that "The peoples of our America will fall into the hands of vulgar tyrants." Why Latin America should have become so prone to personal rule is not easily explained. The legacy of Iberian centralised rule, the example of Napoleon, the power of the military, the absence of any democratic tradition have all been offered to explain the phenomenon. But perhaps the most cogent explanation is that it was a response to chaos. When the Latin American states achieved their independence they emerged "poor, ill, illiterate, indifferent";† moreover, the administration and the economy collapsed and there were few creoles experienced in the arts of government. Small wonder, then, that chaos prevailed. Small wonder, too, that control fell into the hands of ambitious and unscrupulous men. It is significant that in recent decades there has been a tendency, not only in Latin America but elsewhere in the world, to revert to this form of government in difficult times. Dictatorship, while occasionally necessary, successful, and benevolent, usually brings oppression, extravagance, nepotism, graft, and violence. The situation has not been different in Latin America. The malaise attacked every country in turn.

Political maturity is slowly developing, however, and in recent years

* Fraser, *op. cit.*, p. 219.

† Fraser, *op. cit.*, p. 217.

there has emerged a growing dislike of dictatorship. One by one the dictators have been displaced, and in 1963 only Paraguay was ruled in the traditional fashion, following the assassination of General Trujillo of the Dominican Republic. Democratic forms of government have gradually gained ascendancy as literacy has spread, the standard of living has been raised, and political consciousness has developed.

In the past, however, political instability, breeding dictatorship, revolution, and civil war, has been a great deterrent to progress. ("Bolivia had sixty revolutions in the first 100 years of its independence and Colombia ten civil wars."*) "Instability of government," writes Shanahan, "is one of the worst handicaps to the development of a country in the modern world, where progress and prosperity depend essentially upon credit. All the tropical republics of South America have had their share of political disturbances which have rendered property insecure, have hindered the internal accumulation of capital and have kept foreign investors at a distance. In recent years, however, with the extension of railways acting as a unifying force and with the growth of ideas of nationalist individuality and of a common patriotism, revolutionary outbreaks have become less frequent and steadily less successful. Corruption and favouritism are by no means banished from either public or private life, but certain minimum standards of consistent and straightforward dealing are gaining ground, with the result that foreign, mostly North American, capital is beginning to flow for development purposes into the hitherto somewhat neglected outlying tropical areas of South America."†

GEOPOLITICAL ASPECTS

GEOPOLITICAL STRUCTURE

The pattern of population and settlement in Latin America is essentially one of isolated clusters. This is a fundamental and distinctive geographical fact. From a political point of view this has been of tremendous significance, for, in general, it may be said that each population nucleus has tended to form the core of the politically organised area or state; this can be seen quite clearly in the cases of Argentina, Paraguay, and Chile. All the Latin American countries show a concentration of population in the geographically most highly favoured area, *e.g.* the Central Plateau of Mexico, the Humid Pampa of Argentina, and the Great Valley of Central Chile. These and other favoured areas are separated from one another by areas which are less attractive and, accordingly, usually less well peopled.

Thus these centres of concentrated population, which almost invariably contain the capital cities, have become the core or nuclear areas of the various states. Preston E. James, in a study of the political geography of Latin America, has written: "In the process of establishing independence the areas of concentrated settlement that were located close to the centres

* *The South American Handbook*. 1967. P. 10.

† *Latin America*. Pp. 293-4.

of colonial administration and had been effectively governed from these centres were included in the territory of the new independent states. These were Mexico, Peru, Colombia and Argentina.”*

Since the political cores of states stand isolated and are usually separated from their neighbours by tracts of inhospitable and thinly peopled country, there has been, as we have already noted, less possibility of inter-state friction precisely because the frontier regions were voids. Moreover, since the concentration of population was mainly peripheral, the countries tended to look seawards, and in so doing turned their backs upon one another. This is well illustrated by Peru, Colombia, Venezuela, and Brazil, whose interior territories form part of the vast Amazonian selva.

While this pattern brings certain advantages, it brings also certain disadvantages. A certain political weakness is inherent in this pattern. To illustrate this two extracts, defining the nature of a state, are worth quoting: first, Professor James: “A modern, independent nation-State is a politically organized area established and maintained for the purpose of preserving, defending, and fostering the development of a distinctive body of traditions and institutions”;† second, Professor Platt: “The essence of countries is not square miles indiscriminately totalled and set off by boundaries, but people organised and occupying land.”‡

Now many Latin American states have large areas which lie outside the effective national territory—that is they lie outside government control or outside the area which is economically productive. Obviously such areas within a state are a source of weakness to that state. Bolivia, for example, whose Oriente lay outside the effective national territory, realised that, unless she peopled and brought her eastern provinces within the effective national territory, she was likely to lose them; already since independence she has lost tens of thousands of square miles of her Oriente. Moreover, no state can be strong, or even survive, unless it commands the loyalty of its people. Areas that lie remote from the nuclear area are likely to be forgotten or ignored—this charge has always been levelled against Montevideo by the estancieros of the Uruguayan pampas—and this leads to unequal national development and breeds separatist tendencies.

Let us now look for a moment at the problem of Brazil. Some countries, in addition to having a principal concentration of population which forms the core area, also possess one or more secondary concentrations. Brazil is a case in point. Here there are several areas of concentrated settlement, each with important urban foci. In addition, as Fig. 22 on page 51 shows, the well-populated area lies along the eastern coastal margins, with large interior areas lying outside the effective national territory. In an attempt to overcome urban rivalries, to open up the interior, and to weld Brazil into a more coherent whole, a new capital, Brasília, has been founded in the heart of the state. The building of Brasília is an act of faith:

* *The Changing World*. Edited W. G. EAST and A. E. MOODIE. Harrap. 1956. P. 884.

† *The Changing World*. P. 882.

‡ *Latin America*. P. 17.

it is hoped that from it will follow a re-orientation of the economic, demographic, and political life of the country.

Finally, in making any appraisal of the political geography or the political problems of the Latin American states it must be recognised that the national territories are often strongly differentiated not only physically but frequently ethnically as well. The political map exhibits little correspondence with that of natural regions, and international frontiers tend to cut across, instead of coinciding with, regions. This regional variety makes for economic diversity but creates difficulties from the point of view of national unity. If the Latin American countries are to live up to James' definition of a nation-state and to become truly national entities united, stable, and economically viable, then they must link up and develop their discrete parts, open up and populate their empty areas, educate and give equality to their various ethnic groups, and attract the loyalty of the people they govern. Some idea of the conditions, difficulties and problems involved can be gained from a case study and later we shall consider Peru (p. 275).

FOREIGN INFLUENCE AND CONTROL

Although the bulk of Latin America consists of politically independent states, certain, albeit relatively small, areas are under foreign control. The dependent territories are principally colonies belonging to the United States, Great Britain, France, and Holland. The United States exercises sovereignty over the island of Puerto Rico (which is a commonwealth voluntarily associated with the United States), the Virgin Islands, and the Canal Zone in Panamá. The three European powers each have a foothold on the continental mainland and have various island possessions in the Indies. Great Britain has the most extensive and widespread possessions, embracing British Honduras, some of the Leeward and Windward Islands, the Bahamas, and the Falkland Islands.

Apart from absolute or direct political control of certain areas, there has always been a certain measure of indirect political control. This indirect control or influence has emanated from two main circumstances—western hemisphere defence and foreign financial investment. The relations between the Latin American countries and the United States and the countries of Western Europe have been close, one might almost say enforced, in the past because of their military and naval weakness, on the one hand, and because of their dependence on external markets and the lack of domestic capital, on the other.

The Monroe Doctrine, first declared by President Monroe in 1823, which was in effect a "hands off America" injunction to the world at large, has been a cardinal principle of United States policy ever since. While this was, at first, a unilateral policy of the United States, it has since become the common policy of all the American republics, and was reiterated by the members of the Pan American Union by the Declaration

of Lima, 1942, and reaffirmed by the Inter-American Treaty of Reciprocal Assistance signed in Río de Janeiro, 1947.

Basically, of course, the United States has always been concerned with her own security. She has, however, always shown greater interest in the Middle American area than in South America, principally because of the proximity of the area, its strategic importance, and the presence of the Panamá Canal, but also because of commercial considerations. Through the Monroe Doctrine the United States assumed a right to interfere in Latin American national affairs—more especially in the Caribbean region—and on several occasions has done so, *e.g.* in the Dominican Republic, Haiti, Nicaragua. But during recent decades the United States has shown a less selfish attitude and adopted a more benevolent and paternal interest. This change in United States–Latin American relations was inaugurated by President Roosevelt in 1934 by his Good Neighbour policy, a policy which aimed not only at transforming Pan American relations but which also led to much economic aid, welfare work, and the like. Since the Second World War this policy has been continued and large-scale assistance, especially economic, scientific, and technical help, has been given to the Latin American republics.

The good intentions of the United States have been held, by some, to be suspect, and within very recent years there has developed an antagonism to the United States. This antagonism would appear to be founded upon, first, a fear (probably quite unwarranted) of United States imperialism and, second, a feeling of injustice arising out of the fact that a far greater proportion of foreign aid has been meted out to certain Old World countries, such as Britain, France, Greece, Turkey, Iran, and Japan, than to the Latin American states. Moreover, it should be noted that some of the western hemisphere republics, notably Argentina and Brazil, are very conscious of their growing power and challenge United States leadership in Latin America. Hence, as Alexander says, it is no longer possible to lump the nations of Latin America together under the heading “United States Power Sphere.” On the other hand, it behooves the United States, in the interests of her own security, to maintain friendly and close relations with the Latin American states.

The Latin American countries by and large are poor and there has always been a lack of domestic capital. From the earliest days of independence such economic development as has taken place has depended principally upon foreign financial investment and foreign economic enterprise, witness the formerly British-owned railways of Argentina, the United States-owned copper mines of Chile, the development of the petroleum deposits in Mexico and Venezuela, and the British, French, and Dutch investments in the West Indian sugar plantations. Again, the Latin American countries as producers of primary products were extremely dependent on external markets. In the past Argentina was so dependent upon her trade with Great Britain that she was, in effect, a British colony

in all but name. Even today economic circumstances make Uruguay completely dependent upon the outside world for her prosperity, and unless she can dispose of her foodstuffs and raw materials to the countries of Western Europe the threat of economic collapse and unemployment becomes a reality.

In 1952 Bolivia was only saved from complete economic collapse and bankruptcy by the intervention of the United States, who bought up Bolivia's surplus tin, provided free food, and granted economic assistance. Precarious economic conditions of this kind mean that countries inevitably become dependent upon other, more economically powerful, states which can, if they are so disposed, attach "strings" to trade agreements. In this way indirect political control may be exerted. To be free of foreign economic imperialism has become one of the shibboleths of many Latin American states since the end of the Second World War. But in freeing themselves of such control some countries have slowed down their own economic expansion.

THE PANAMÁ CANAL

The Panamá Canal forms one of the two major inter-ocean passages in the world. Like its Old World counterpart, the Suez Canal, its prime function is as a carrier of commerce. Even in this respect it has a political importance, but from the geopolitical point of view it possesses military as well as economic value. In the heyday of naval supremacy prior to the Second World War the Canal was of first importance to the United States, for it enabled her to switch her Atlantic and Pacific fleets from ocean to ocean with great facility. With the development of aircraft and the long-range striking power of aeroplanes—and more recently of rockets—the strategic importance of the Canal has lessened considerably.

The role of the Canal in the United States' strategic plans has clearly undergone a reappraisal. Formerly the Canal was regarded as being of sufficient strategic value and significance to warrant its operation at a deficit, but it is evident from the terms of the new Panamá Canal Company set up in 1951 and of the revised treaty with the Republic of Panamá signed in 1965 that the United States has re-examined her conception of the role which the Canal plays in United States strategy. The re-interpretation of the Canal's strategic importance becomes apparent from the fact that the pre-war plans for a projected third set of locks appear to have been shelved, while the proposal to convert the present highly vulnerable lock system into a sea-level canal has gained little support.

The former importance of the Canal in the United States' military defence system was largely responsible for her seeking and maintaining bases in the Caribbean area and for her deep concern with political developments in the Middle American theatre. Now, in spite of its reduced significance, the military implications of the Canal cannot be ignored. The present position has been summed up, probably correctly, thus: "The Panamá Canal is becoming less a strategic focus vital to American se-

curity and more exclusively a commercial cross roads operated at cost by the United States for the benefit of itself and the world. The greatest beneficiary of the Canal is the Republic of Panamá itself."*

POLITICAL PROBLEMS

TERRITORIAL DISPUTES

We have already mentioned some of the more important territorial disputes and conflicts which have occurred among the Latin American states. Although these conflicts were settled, the problem has not always been solved. Here we are concerned only with the four most important territorial problems.

The first relates to Guatemala and British Honduras. Several years ago many people in Belize, capital of British Honduras, received Christmas cards bearing a map showing the British colony annexed to the neighbouring state of Guatemala and bound with a chain carrying the imperial emblem of the lion and the unicorn split in two. This symbolised Guatemala's claim to Belize—as they call British Honduras—and the greetings cards were sent by a Guatemalan committee styling itself "The Committee for the Recuperation of Belize."

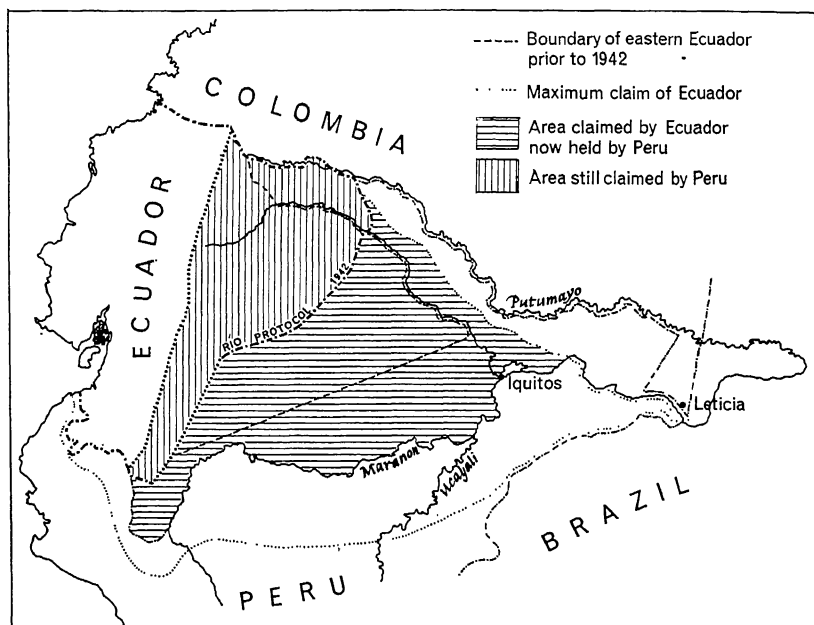
Guatemala has laid claim to the British colony for over a hundred years; in fact, as long ago as the 1820s. The legal controversy is long and complicated. In brief the story is this: the earliest British inhabitants in the area were pirates and logwood cutters, but subsequently Spain granted certain rights to the colonists while maintaining her rightful sovereignty over the area; but when the Central American republics achieved their independence and Spanish sovereignty was disavowed, Guatemala claimed British Honduras as being part of the Central American mainland and part of the ancestral Mayan homeland. A treaty was in fact signed between Great Britain and Guatemala in 1859, but its terms were never fulfilled, and on this account could be claimed as null and void. In 1933 Guatemala revived her claims to the British colony and has continued to press them. In face of a recent threat Britain sent a warship to Belize, and this appeared, temporarily at least, to solve the problem.

Apart from any legal title which Guatemala may have or not have, she desires British Honduras for two reasons: first, because under the present frontier demarcation the department of Petén, covering approximately one-third of the republic, is isolated and cut off from its natural outlet eastwards and, secondly, the Guatemalans, at heart, cherish the hope of a Greater Guatemala, making her the largest territorially of the Central American republics as she is already the most populous.

The second important political problem centres on the conflicting territorial claims in the upper Amazon basin, where Colombia, Ecuador, and

* BRUMAN, HENRY J. "The Caribbean and the Panama Canal" in *The Changing World*. Ed. EAST and MOODIE. P. 877.

Peru meet. Boundaries in this vast and virtually empty selvas region were vague at the time of independence, but Ecuador claimed the upper Amazon basin, roughly between the Rivers Marañon and Napo, as hers. Unfortunately Ecuador did little or nothing to open up and colonise her territories east of the Andes. Peru, in contrast, was more active, and settlers followed the Ucayali downstream, founding the river port of Iquitos. During the present century Peru began to take positive measures



[After Bowman and Platt.]

FIG. 30.—Ecuador: political map.

to extend her jurisdiction over this area. In so doing she came into conflict with Colombia as well as Ecuador. In 1927 Colombia agreed to recognise Peruvian claims to eastern Ecuador in return for a corridor of territory, bordering the Brazilian frontier, giving her the river port of Leticia. Poor Ecuador has seen her eastern territories whittled away bit by bit and in 1942 she relinquished a further slice to Peru. Not content with these additions, Peru now claims all Ecuadorean territory east of the Andes. Ecuador refutes completely this Peruvian claim and is adamant that no more sacrifices shall be made. Although the present international boundary was agreed upon following the findings of a boundary commission set up by both Ecuador and Peru, many Ecuadoreans still view the Marañon as their rightful southern frontier while some claim a wide zone south of the Marañon as well. Any important economic developments in this area, such as the finding of rich oil deposits, could easily lead to further disputes.

The dispute over the Gran Chaco has already been referred to and, although the bitter struggle between Bolivia and Paraguay was ended in 1935, the Bolivians still smart over the settlement. Not only did Bolivia lose a substantial area of territory but the Bolivians suffered an ignominious drubbing by the brilliantly led Paraguayans. The exhausting and impoverishing struggle was scarcely worth the while, for the Chaco is a large, empty, unattractive plain which holds little promise for the future. Almost the only resource of value in this wilderness is petroleum, and even this has never fulfilled expectations. The Chaco area, gravely disputed since 1870 by Bolivia and Paraguay, lies between the rivers Paraguay and Pilcomayo. The future of the area remains uncertain, not only economically but also politically. Its trouble potential remains large.



[After Borchart and Schurz.]

FIG. 31.—Bolivia: political map.

As we have already seen, the War of the Pacific (1879–83) resulted in Bolivia losing its Pacific coastline, making it a landlocked state. The long-standing dispute between Chile and Peru over the Tacna–Arica area was not finally settled until 1929 when, as a result of pressure from the United States, the two republics agreed to settle their differences. By mutual agreement the disputed Tacna–Arica area was divided, Chile keeping Arica, Peru receiving Tacna. Under the same agreement the port of Arica was to become a free port for Bolivia. Bolivia still hankers after a Pacific outlet, and to salve this running sore it has been suggested that she

should be given a corridor to the coast. Such a gesture on the part of Chile would do much to wipe out the long enmity between the two countries.

Finally, there remains the controversy between Great Britain and Argentina over the Falkland Islands in the South Atlantic. The islands were visited by English navigators as early as 1592, but were subsequently visited and colonised by the French, who, in 1766, ceded their rights to Spain. In 1767 Britain re-asserted her rights to the islands. A post was set up but abandoned a few years later. No further occupation occurred for a period of nearly fifty years, and then, in 1820, Argentina, newly independent, garrisoned the islands. Ten years later Britain, once again, re-asserted her authority, expelling the Argentinians and declaring the Falklands British territory. Since 1832 the islands have remained in British hands and been developed as a naval, bunkering, wireless, and meteorological station. Argentina never recognised British sovereignty over the Malvinas, as they call the islands, and since the Second World War the Argentinians have vociferously pressed their claims.

These five cases do not, of course, exhaust the territorial disputes in Latin America, but they are, perhaps, the most important and the ones most likely to cause future friction.

THE COLONIAL TERRITORIES

Colonial territories remain in the West Indies and on the American mainland, but their total area is small. Great Britain, the United States, France, and Holland are the occupying powers. What, it may be asked, is the attitude of the Latin American states to the colonial situation? Since all the states are ex-colonies by origin, there is, as one might expect, a natural prejudice against the institution of colonialism. Moreover, the fact that foreign control exists within the Latin American realm interferes (theoretically at least) with "hemisphere solidarity." The colonial system, however, has caused comparatively little trouble, partly because the colonial territories were islands or isolated areas, such as the Guianas, and thus out of contact with the sovereign states—the exception is provided by British Honduras and here, significantly enough, there has been most trouble—and partly because, in the past, native apathy has raised no political problem to which the Latin American countries could lend their support.

Since the Second World War there have been changes in the status of the different colonial territories. Puerto Rico has become (1952) a commonwealth in association with the United States; this has meant that the Puerto Ricans have become completely self-governing with respect to all domestic affairs, defence and foreign affairs alone being conducted by the United States. The Puerto Ricans have retained their American citizenship. The French West Indian islands of Martinique and Guadeloupe have had the status of departments of France since 1946; thus they are integral parts of the French Republic and send deputies to the French Assembly.

The "colony" of French Guiana is, similarly, an integral part of France and has been such since the legal change in its status in 1946. The Dutch possessions include the Netherlands Antilles and Dutch Guiana on the South American mainland. Under a new legal order, known as the Charter for the Kingdom of the Netherlands, which came into force in 1954, both the Antilles and Guiana are autonomous territories on an equal footing with the Netherlands. Theoretically, the Dutch territories in America are subject to the Queen of the Netherlands alone, although in practice foreign and defence matters continue to be managed by the Dutch Government in Europe.

Perhaps the most significant change relates to the British West Indies. The various islands differ considerably in size, population, ethnic make-up, economy, etc., but the idea of some close association has been mooted for two or three decades. The full story will be told later: suffice it to say that at the end of the Second World War definite proposals were put forward for a West Indian federation which would form an economic entity and which would ultimately become fully self-governing. As a result of the London Conference, 1953, it was agreed that a British Caribbean Federation should be established which would include all the island territories. The original plan envisaged the inclusion of British Honduras and British Guiana in the Federation, but the two mainland colonies were unwilling to join, largely because they feared they would suffer an inundation of immigrants from the more populous islands. Accordingly, British Honduras and British Guiana remained outside the Federation, although it is worth noting that the constitution was so devised that they could accede to the Federation at a later date if they so wished. Unfortunately the Federation had but a short life. It collapsed in 1962, only four years after its inception.

ANTARCTIC PROBLEMS

The political geography of Antarctica may seem out of place in a book on Latin America, but since both Argentina and Chile lay claims to segments of the Antarctic continent and the Antarctic seas a brief notice of the issues involved will not be entirely amiss.

The continent, with an area of approximately 5 million square miles, is uninhabitable in the sense that it cannot support settlement without external assistance. All bases have to be victualled and supplied with the necessities of life from outside. Even the bases for whaling fleets are stationed on offshore islands and not on the continent itself. The only real value the Antarctic territory currently holds is in connection with meteorology, although there are certain mineral and fuel deposits. Whether the latter will ever be capable of exploitation is more than doubtful. Hence, it is rather surprising that both Argentina and Chile should so hotly contest their claims.

The claimants to various parts of Antarctica include, besides Britain, Argentina and Chile, New Zealand, France, Australia, and Norway. It is

worth noting that the United States and the Soviet Union lay no official claims to territory as such, but do lay a claim to a voice in the carving up of the continent. The dispute between Britain, Argentina, and Chile relates to the sector between 20 and 90 degrees W. The claims of each country overlap. Within the sector, the bulk of which is claimed by Britain as the Falkland Island Dependencies, Britain has sixteen bases, Argentina eight, and Chile four. Argentina claims sovereignty over most of the area covered by the Dependencies. Chile, on the other hand, lays claim to the western portion of the British sector (which, incidentally, embraces some of the territory claimed by Argentina) plus a wedge of land lying to the west of the Dependencies (see Fig. 32).

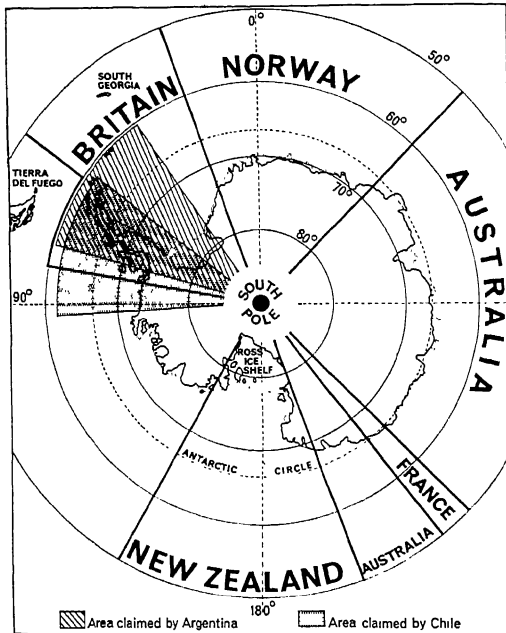


FIG. 32.—Antarctica: political map.

The Latin American states base their claim upon historical and geographical premises: Spanish inheritance and territorial contiguity, the first of which is flimsy to say the least, the second politically invalid at the present time.* The British have consistently based their claim upon the effective occupation of the Dependencies territory, which, as Kirwan says, "appears indeed to be the most acceptable basis in law for a title to sovereignty." In 1954 Britain offered to refer the Antarctic dispute to the International Court of Justice, but the offer was turned down by Argentina and Chile. So the dispute remains in deep freeze.

* KIRWAN, L. P. "The Partition of Antarctica" in *The Changing World*. Ed. EAST and MOODIE. Pp. 994-5.

REGIONAL GROUPING

We have now reviewed the geographical framework—the physical, cultural, economic, and political conditions and characteristics—of the Latin American region. We can now proceed to the regional description of the area. The subdivisions adopted in Part II are not used merely for convenience but are based upon differentiating geographical and political conditions. Different authors would doubtless choose different groupings, but it is highly likely there would be a measure of agreement in many instances. For, notwithstanding the wide variety of physical and human elements in Latin America which we have tried to emphasise, there are between area and area regional complexes arising out of historical, cultural, and political associations, as well as purely physical conditions, which give rise to regional distinctions.

Mexico, Central America, and the West Indies comprise a transitional area between the United States and South America. There are, however, noticeable and significant differences between the mainland area and the insular area and, accordingly, they are divided into two separate subdivisions. Mexico and Central America form for the most part a structural and physiographical continuation of North America. The population is mainly Indian and mestizo, the African element being very small. Economically, Mexico is dependent upon agriculture and mineral wealth and remains still a poor country. The Central American Republics are, in many ways and especially economically, small replicas of Mexico. In all these countries there is a serious land problem. In the past coffee has been the economic mainstay of most of the Central American Republics. This transition region forming a land bridge between the continental areas to the north and south is distinctive and this distinctiveness may be said to be reflected in the fact that no Mexican or Central American likes being called a "South American."

The West Indies differ from Mexico and the Central American Republics in their insular character, their strongly African population, and, with some exceptions, their dependent or semi-dependent status. The economy is largely based on single-crop (usually sugar) plantation agriculture. Though many changes are currently taking place, the islands may be said to be characterised by the dominance of plantation agriculture, dependence upon a single export crop, absentee ownership of land, a high birth-rate and death-rate, appalling poverty of the masses, widespread illiteracy, and a lack of social welfare.

The region of Northern South America consists of Colombia, Venezuela, and the Guianas. The Guianas, as thinly peopled, economically underdeveloped, "colonial" territories, may seem to have little in common with Colombia and Venezuela, but all three territories look northwards and are drained by northward-flowing rivers. Though there are significant differences between Colombia and Venezuela, the two republics have many similarities, among them similarity in size and broad

physical characteristics, an erratic distribution of population clusters, a preponderance of settlement in the highlands, a considerable element of pure Negro population, and notable mineral resources, especially oil.

The Central Andean Republics of Ecuador, Peru, and Bolivia are essentially high-plateau countries. The Andes dominate them. They are predominantly native Indian countries; in each case over half the total population is Indian, while most of the remainder is mestizo with a strong Indian component. All three share a common history: not merely were they all

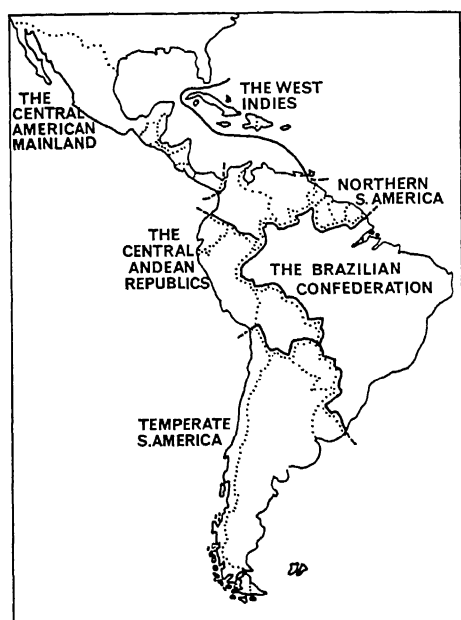


FIG. 33.—Latin America: major regions.

part of the Spanish Viceroyalty of Peru but they were all part of the pre-conquest Inca Empire. They are distinguished by their general backwardness and poverty. The people are poor and the per capita income is very low—considerably lower than in all but one or two of the Latin American countries. Their export trade, too, is small. In each country agriculture and mineral wealth are the pillars of the economy. Another distinguishing feature they share in common is the unusually high proportion of rural to urban population. The towns with populations of 100,000 and over, in all three countries, can be counted on the fingers of both hands.

Unique among the major divisions of Latin America is Brazil, since it comprises a single political unit comparable in size to some of the regions which embrace several large countries, and it is the only Latin

American Portuguese-speaking state, a fact which clearly differentiates it from all the other republics. Brazil is distinctive as the largest, most populous, most industrialised, and most powerful of all the Latin American countries.

Finally, there is a group of countries in the southern portion of the South American continent: these have been designated Temperate South America. Such a title is not altogether satisfactory, since Paraguay, both by location and climate, is not temperate. A convenient term would be the Río de la Plata Countries if Chile were excluded. But Chile has more in common with Argentina and Uruguay than with the Andean Republics with which it is sometimes classed. Paraguay, on almost all counts, is the odd man out, but is grouped with Argentina, Uruguay, and Chile for the sake of convenience. All these southern states with the exception of Paraguay are predominantly temperate in climate, preponderantly European or mestizo in their ethnic composition, basically agricultural and pastoral but possessing considerable industrial development, and leading exporting countries with a high per capita income. Paraguay differs from the others in its inland situation, its strongly Indian population, and its economic backwardness.

PART TWO

THE REGIONAL PATTERN

Chapter V

THE CENTRAL AMERICAN MAINLAND

THE geographical area which lies between the essential continental areas of North America and South America is described in a variety of terms. Caribbean America, Central America, Middle America, and the American Mediterranean region are all used. They are not, unfortunately, interchangeable terms: each has a different and distinct connotation. Here, however, we shall make a simple division of this "in-between" area into two parts, the Central American Mainland and the insular region of the West Indies.

The Central American Mainland is taken to include the continental mainland territories lying between the Río Grande in the north and the Panamá-Colombian frontier in the south. Politically the area includes Mexico and the Central American countries of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panamá, together with the British colony of British Honduras.

The term "Central American countries" should perhaps be reserved for the above-mentioned countries, Mexico excluded. Although, it is true, Mexico is frequently loosely classed as being part of "Central America", it is not, strictly speaking, a part of that region, since it differs markedly in many respects from the Central American Republics. Certain geographical, historical, economic, cultural, and political similarities do exist between Mexico and the six small republics, but, on the other hand, there are important differences. Thus, within our designated Central American Mainland area, we can distinguish two parts, Mexico and the Central American States.

Mexico and Central America provide a link between the United States and South America. Although it is customary, and correctly so, to include the Central American Mainland within the wider cultural realm of Latin America, it is a distinctive sub-region of that realm. While acknowledging themselves "Latin Americans" the peoples of Central America, as well as Mexico, dislike being called "South Americans." They react to such a designation in much the same way as do the Scots when they are dubbed "English."

The Central American Mainland region has in a superb degree a characteristic which we shall meet repeatedly in this study of Latin America, namely, startling contrasts. Physically the terrain ranges from flat, marshy lowlands to towering volcanic peaks. The climates range from arid desert and cold alpine to sweltering tropical conditions. The vegetation embraces an equally wide range from desert scrub through tropical grassland

to rain-forest; the region, in fact, possesses one of the richest flora in the world. Not surprisingly, as a result of these variations in relief and climate, virtually every kind of crop, tropical or temperate, may be and is grown in the region.

From the point of view of agricultural, forest, and mineral resources the region is well endowed and the potential wealth is great. So far, however, economic development has been restricted and much hampered by historical factors, political instability, primitive agricultural systems, lack of capital, and the illiteracy of the people.

From ancient times until the Latin American countries won their independence from Spain, Mexico and the Central American Republics shared a common history. In pre-Conquest times much of the region was ruled first by the Mayas and, subsequently, by the Toltecs and Aztecs. The Maya civilisation, perhaps the most advanced ever developed in the Western Hemisphere and certainly vying with if not indeed surpassing that of the Incas of Peru, has left an impressive record of its achievements in architecture, sculpture, astronomy, and mathematics. Scattered throughout the region, notably at such sites as Petén, Copan, Quirigua, and Kaminal-Juyu, are the magnificent ruins of great temples which provide ample testimony of the former greatness and splendour of the ancient cultures. There is little doubt that this high level of culture reflected a high standard of life, itself made possible by the favourable combination of climate and soil.

All the native cultures appear to have been in eclipse when the Spaniards arrived. The Spanish Conquest, at any rate, ushered in a new era. Colonial rule brought many changes and innovations. Not all the changes, to be sure, were to the good, but Spanish rule left a legacy which has contributed much to the character of the region. Since Mexico was more attractive to the Spaniards than Central America, the former shows a more indelible Spanish imprint. Although the Conquistadores and, later, Spanish colonists established themselves principally in Mexico, they did not entirely neglect the Central American area. Their occupation and economic exploitation is attested by the palaces, churches, and residences which are found, though these are less magnificent than those of colonial Mexico.

In spite of their long period of control, the number of Spaniards at no time was very large; probably considerably less than half a million Spanish immigrants settled in the region. Since the immigrants were predominantly men, inter-mixture with the indigenous Indians was common, and this accounts for the large element of mixed breeds in the present-day population. The population of Mexico and the Central American Republics, with the exception of Costa Rica, is overwhelmingly Indian and mestizo.

The position of the region between the two continental blocks of North and South America gives it a political, strategic, and economic significance. Forming part of the larger political region of Latin America and

being so close to the United States, its political complexion and associations are of great importance with respect to Western Hemisphere defence. The Panamá Canal, cutting across the narrowest part of the isthmus and linking the Atlantic and the Pacific Oceans, is of great significance, both commercially and militarily, not only to the United States but to the Americas as a whole.

MEXICO

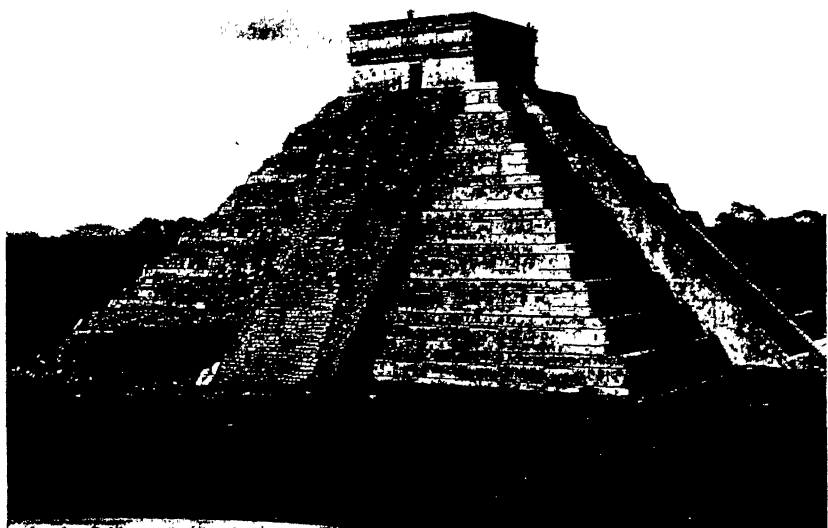
Mexico, though geographically a part of North America, is much more akin to South America. Its past history, its people, its culture, and its economy link it with the countries to the south rather than with those to the north and, since it exemplifies many of the characterising features of the Latin American countries, it is usual to class it as part of the Latin American realm. Although Mexico adjoins the United States and is separated from its great northern neighbour only by a boundary which is largely artificially demarcated, it is, nevertheless, effectively cut off from the United States, since the frontier traverses a sparsely populated, semi-arid area and the real core of Mexico lies almost a thousand miles to the south. With an area of 758,000 square miles, Mexico ranks, after Brazil and Argentina, as the third largest Latin American country. Mexico, whose full name is *Estados Unidos Mexicanos* (the United States of Mexico), is a federal republic of 29 states, two territories, and the federal district of Mexico City. It is a land with a somewhat lurid past but a country with considerable possibilities; during recent years much progress has been made, and many authorities predict for it a rosy future.

HISTORICAL BACKGROUND

To understand modern Mexico's human geography and economic problems some knowledge of its past history is necessary. This history may be briefly summarised as follows. When Columbus discovered the Americas, much of Mexico was ruled by an Indian people, the Aztecs, who had displaced and partly absorbed the Toltecs, an earlier people. Borrowing from the Toltecs, the former had developed a high degree of civilisation and possessed a fine capital city, Tenochtitlan, the site of which is now occupied by Mexico City. Farther south, in the peninsula of Yucatán, lived another Indian people, the Mayas, whose civilisation was in the last stages of decline. The Aztecs were conquered by Spanish adventurers under Hernan Cortes in the early part of the sixteenth century. As a result Mexico became a Spanish colony. Though many Spanish settlers colonised Mexico, numerically they were few in comparison with the indigenous inhabitants; hence the population of Mexico today remains predominantly Indian but with a large mestizo or mixed element.

The Spaniards remained in control of Mexico for almost three centuries, and this simple but very important historical fact has had two very significant influences: first, it has given Mexico a strong element of

Spanish culture, patent in the language, religion, architecture, and customs of the people, which colours life to this day and, secondly, it bequeathed an agrarian system of large estates and landless peasantry, a socio-economic condition which lay at the root of the Mexican Revolution of 1910. In emphasising the importance of the Spanish cultural element, one should not underestimate the significance of the native Indian tradition; in fact,



(Courtesy: Robert S. Anderson.)

FIG. 34.—Mayan ruins, such as these at Chichen Itza, abound in Yucatán. Pyramidal structures (ziggurats) are as common in the Americas as they are in Egypt and Mesopotamia.

modern Mexican art, for example, which shows original and striking achievements, has been stimulated mainly by Indian influences.

The ideas emanating from the French Revolution and the political disturbances arising out of the Napoleonic Wars led, in Mexico, to the revolutionary war of 1810–21, when the country asserted its freedom and severed its connections with Spain. But independence did not bring tranquillity and until 1867, when the new Republic, which has endured to the present day, was set up, Mexico went through a troubled era of revolutionary and counter-revolutionary activities, including a war with the United States. The long struggle for independence and self-determination had the effect of nurturing a national consciousness among the people of Mexico.

In 1877 Mexico entered a new phase of its history. In that year President Porfirio Diaz began his long period of government. Initially brought to power by force, the Diaz regime was subsequently established constitutionally. It was in effect a dictatorship, but one of the mild, paternal kind. During Diaz's extended rule (1877-1911) Mexico enjoyed a period of comparative peace and material progress. It was, in the words of Eduardo Villaseñor, "the first sustained effort towards economic progress. It was the first period in which public services were organised, a real civil service established, sound finances adopted and a plan of national development begun."* Diaz, however, was eventually overthrown, but during his rule the country had been opened up to foreign capitalists who exploited Mexico's mineral wealth, established plantations, built harbours, laid railways, etc. Although this was a period of purely exploitive capitalism, it did lead to the development of Mexico's natural resources and introduced her to modern civilisation.

In 1910 revolution broke out followed by civil war. In 1917 a revised Constitution was introduced. The revolutionary programme was one not only of political but also of social reform. Under the new order the dispossessed peasants were to be given land and the standard of living was to be raised. Though some early efforts at agrarian reform were made, the solution of the problem was largely delayed until Cárdenas came into power (1934), when the large estates were divided up and shared out among the peasants who worked upon them. The policies of nationalisation of resources, of expropriation of foreign oil companies, of the subdivision of the big estates, and of the expropriation of church property alienated many both within and without Mexico and resulted in a period of economic stagnation. However, since the end of the Second World War, and partly owing to that war, Mexico has enjoyed an economic boom. As a result of President Aleman's economic wizardry the industrialisation and modernisation of Mexico were accelerated. Moreover, the investment of foreign capital has, once more, been permitted, but this time on Mexican terms. It would, of course, be idle to pretend that Mexico has no problems of either an economic or a social nature but the situation is happier and more promising than ever before in the country's history.

PHYSICAL FEATURES

There is a story that Cortes, when asked about the geography of Mexico, took a sheet of paper, crumpled it in his hand, and then threw it down saying: "That is the map of Mexico." Such a description may be an exaggeration, but it certainly contains an element of truth. Except for the great plateaus of northern Mexico, much of the remainder of the country is mountainous or possesses a rugged terrain.

Physically, Mexico consists of a central tableland averaging 6000 ft above sea-level, which is flanked on either side by a range of mountains. On the east is the Sierra Madre Oriental, on the west the Sierra Madre

* "Mexico: An Interpretation." *Progress*, vol. 44, autumn 1954.

Occidental. Both these mountain systems, which rise up abruptly from the narrow coastal lowlands fronting the Gulf of Mexico and the Pacific Ocean respectively, are a continuation of the ranges of the North American cordillera just as the Mexican Plateau is a southward extension of the western plateaus of the United States. The Californian Peninsula, which is politically part of Mexico, continues the line of the Coast Ranges of California; this long, narrow, mountainous southward-projecting peninsula is separated from the Mexican mainland by the Gulf of California, which in the north is gradually being silted up by the deposition of alluvial material brought down by the Río Colorado.

The Mexican Plateau is by no means flat, though extensive level areas do occur. During the Cretaceous period the region was submerged, but subsequent uplift, accompanied by faulting, resulted in the ridging of the plateau surface, and this has left a pattern of roughly north-south hill ranges separated by intervening valleys which are partly filled with accumulations of rock waste. The plateau narrows southwards and, at the same time, becomes more elevated. It culminates in the lofty Central Plateau, which is the "core region" of Mexico and which contains the capital city. This is the true heart of Mexico and the national centre of gravity. Mountains, running on an east-west axis, cross this core region. Recent uplift led to much volcanic activity and several lofty volcanoes—among them the magically named Orizaba (18,000 ft), Popocatepetl (17,880 ft) and Ixtaccihuatli (17,670 ft)—tower up to snow-capped peaks of great scenic grandeur. Recently, in 1943, a new volcano, Parícutin, appeared near Uruapan about 250 miles from Mexico City. Beginning in a farm field, the eruption continued for several months and built up a large cone. It is not often that man can watch the very birth of a volcano. The vulcanism of these highlands has given rise to a distinctive region; here, as a result of volcanic deposits of ash, are smooth, fertile areas which have provided favourable natural conditions for human settlement. It is as Professor Platt* has remarked, no mere coincidence that this region of volcanic activity should also be the region of densest population and greatest human activity in Mexico.

The Mexican Plateau ends at, and descends abruptly to, the isthmus of Tehuantepec, where the Gulf and Pacific lowlands merge and give an easy route between ocean and ocean. East of this isthmus are the Chiapas Highlands, which continue into the adjacent country of Guatemala, and the wide, low-lying, limestone platform of the peninsula of Yucatán.

Mexico has few rivers of significance. The North-east Trades bring much rain to the eastward-facing slopes of the Sierra Madre Oriental and numerous streams drain towards the Gulf, entering the sea by way of the coastal lagoons which fringe the concave shore. Surface drainage is conspicuously absent in the karst plateau of Yucatán. On the Pacific coast more particularly south of the tropic, torrential rains fall during the summer season and numerous rivers of largely seasonal flow find their way to

* *Latin America*. P. 211.

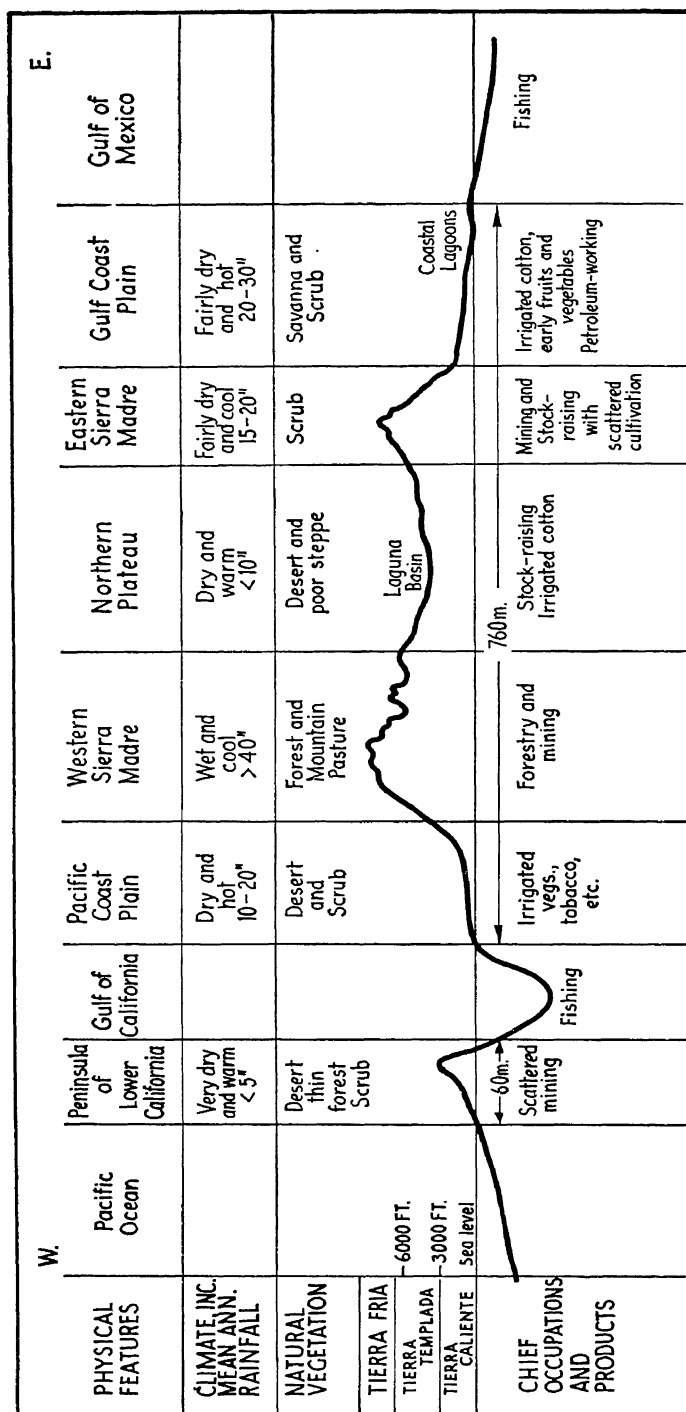


FIG. 35.—Cross-section of Mexico.

the Pacific. All the rivers suffer seasonal fluctuations; those towards the north are distinctly intermittent, but southwards they show a greater measure of persistence. Most of these streams are swift-flowing and deeply trenched. The interior plateau has few streams of note: some, such as the Río Conchas, which is the most important, drain northwards towards the Río Grande; others fizzle out in the saline marshes of the shallow interior depressions. Lakes, many of great beauty, are fairly numerous, especially in the Central Plateau region.

The physical characteristics of Mexico's geography are responsible for many of the country's problems: the aridity of the northern plateau, the swamps and jungles of the south, the relatively limited area of arable land, the rapid run-off and soil erosion, the lack of rivers suitable for irrigation, and the difficulties of inter-regional communication. On the other hand, certain advantages derive from the country's natural ruggedness and variety of geology: the relief gives a wide variety of altitudinal climates and affords possibilities of hydro-electric power generation, while structural and rock differences have endowed Mexico with a rich and varied mineral wealth. Mexico provides a good example of Nature's inherent justice: what she takes away with one hand, she gives with another.

CLIMATE AND VEGETATION

Climatically, the outstanding feature of Mexico is the great range of climate. This is the result of two basic facts: position and relief.

The northern tropic runs through the middle of Mexico, hence the northern part is sub-tropical and falls within the great desert belt while the southern portion of the country lies in the tropical zone and falls within the Trade Wind belt. In northern Mexico fairly arid conditions prevail generally, but the western coastlands are very dry and true desert conditions are found. The peninsula of Lower California is likewise very dry. South of the tropic, the eastern and western coastlands and sierra slopes and the isthmian region receive copious rains in summer brought on the east by the onshore Trades and on the west and south by monsoonal influences. From Tampico southwards, the winds from the north-east bring heavy summer rains which amount to 60 in. and over, although Yucatán, by virtue of its low-lying nature, receives slightly less, the northern tip of the peninsula getting less than 30 in. On the south-western coastlands, approximately south of Cape Corrientes, heavy monsoonal rains are experienced with, in places, as much as 80 in. This monsoonal influence results from the low pressure which develops over the plateau during the heat of summer, so that air streams from the ocean, carrying moisture, are drawn in towards it. Conversely, during the winter season the plateau becomes a cool region of high pressure with dry, out-blowing winds.

Lower California and the north-western portion of the mainland experience high summer temperatures, but the winters are cool. Conditions on the central plateau are, on the whole, temperate. The high elevation

tends to reduce temperatures; even so, in summer, the sun is hot and temperatures are high. Nights, however, are often distinctly chilly and a wide diurnal range of temperature is a characteristic feature of the climate. During the rainy season the morning is usually bright and pleasant, mid-day brings heat, and late afternoon or early evening heavy showers. Throughout the remainder of the year the climate is usually cool, dry, and bracing. The coastal lowlands of the isthmian region are distinctly tropical, being hot, humid, and wet throughout most of the year. The Pacific coast plains are warmer than the lowlands fronting the Gulf of Mexico, and the latter, in their more northerly parts, in winter frequently experience "northers," strong, cold winds which sweep down from the United States.

Temperature varies with altitude, and the very considerable differences in elevation within Mexico enable three well-marked and readily recognisable climatic zones to be distinguished. These belts, based on altitude, have already been referred to: they are the *Tierra Caliente* or hot lands up to approximately 3000 ft; the *Tierra Templada* or temperate lands lying generally between 3000 and 6000 ft but sometimes a little higher; and the *Tierra Fria* or cold lands usually above 6000 ft. Thus Mexico possesses within its borders an extremely wide variety of climates, a feature reflected in the very large variety of crops produced (*see* Fig. 36).

As a result of this great range of climatic conditions Mexico has an equally wide range of vegetation types: these run from barren desert in the north to dense tropical forests in the south and from saline marsh vegetation to mountain-top flora.

SOCIAL GEOGRAPHY

Several Indian tribes occupied Mexico prior to the Conquest, but the most influential were the two groups already mentioned, the Aztecs and the Mayas, who lived in the high Central Plateau and the Peninsula of Yucatán respectively. Both had developed cultures and social organisations of a high order, although the Aztecs had developed a horrible and cruel religion which demanded continuous human sacrifices. They, and the Mayas too, were magnificent builders, and the ruins of many of their wonderful architectural edifices remain to this day. Noteworthy, also, is the system of communal land-tenure which the Aztecs had, especially in view of modern Mexico's return to a similar agrarian system. Exactly how many the Indians numbered at the time of the Conquest it is impossible to say; it is likely they formed relatively small scattered groups spread unevenly over the vast territory of the country.

Spanish rule brought great changes. As conquerors, and as a proud and aristocratic people, they became an upper, ruling class who enslaved and degraded the native Indians. The latter, together with the group of mestizos or mixed breeds which gradually emerged, filled the role of serfs who worked for the landowning aristocracy. The Indians were dispossessed of their land, which was given to the Conquistadores, the Church,

and favoured immigrant settlers. Thus during the colonial period there grew up in Mexico an organised government of the rich, landed, Spanish upper class, relatively few in numbers, which was based upon the toil and misery of the mass of the population. Although, eventually, independence brought an end to Spanish rule, the system which had evolved persisted and was not changed until the Revolution. During the last two or three generations great and far-reaching changes have taken place.

Formerly, the social structure was one of great opposites and contrasts. Yet racially there has been considerable fusion. The number of pure bred "Criollos" or "Creoles," *i.e.* descendants of Spaniards born in Mexico, is small—certainly less than 10% of the total population. The Indian element is much larger, accounting for about 30% of the population, but perhaps only about one-third of these (approximately 3 million) may be said to be of pure native blood. The vast majority of the population, some 60%, is of mixed race, though much more Indian than white. The number of foreign immigrants and residents, *e.g.* Americans, Europeans, etc., is small.

A striking demographic feature of Mexico is the growth of the population. During the last half century there has been a continuous and rapid growth of population: 13 millions in 1900, 15 millions in 1910, 20 millions in 1940, 26 millions in 1950, and 34.6 millions in 1960 according to the census; it is now about 45 millions. The current rate of increase of 3.4% per annum ranks among the highest in the world.

Christianity, originally imposed upon the native Indian peoples by force, is now, in its Roman Catholic form, the religion of the great majority of the people. Spanish is the official language of the country and is spoken by about 90% of the population. Several indigenous languages are spoken by the Indians, but these native tongues are found mainly in the remoter parts of Mexico.

Religion and language are but two, and the most obvious, of the cultural features imported from Spain; there are many others. Equally obvious, however, is the legacy of Indian culture, and Mexico's civilisation is of a dual character. "Two ancient streams of human culture, the Middle American and the Mediterranean Spanish . . . have joined in a combined stream in which the characteristics of both can be seen though they cannot be disentangled."* This Indo-Hispanic cultural synthesis has produced in Mexico a culture that is "recognizably, distinctly and exclusively Mexican." But during recent times Mexico has come to feel the impact of another culture, the modern material culture of the United States, whose influence is already apparent in the urban areas. Rural Mexico, however, still remains unaffected.

THE LAND PROBLEM

The pre-Columbian system of corporate land tenure was supplanted after the Spanish Conquest by the hacienda or large estate system. The

* MIDGLEY, J. "Spain in Mexico." *Geogr. Mag.*, vol. 26, 1953, p. 47.

great estates of the colonial era were formed either from the land previously owned and worked by the Indians or out of the vast thinly peopled or empty territories of the northern plateau. These landed properties, in the hands of a small, privileged class, were worked by the peons as the poverty-stricken, landless peasants were called.

This feudal system prevailed throughout the Spanish Colonial Period; it was so well established that it continued after independence. Though agrarian discontent periodically gave rise to revolt during the nineteenth century, the system remained unchanged because the economic and social reforms always became bogged down in politics. The Mexican Revolution of 1910, however, wrought a change: it was as much a social as a political revolution, and one of its prime objects was to restore to the land-hungry peasant his legitimate heritage.

In 1915 an Agrarian Reform Law was passed which empowered the Government to appropriate land for redistribution to the landless labourers. The land which came to be confiscated belonged, it should be noted, not only to the Creole landlords but also to the Church and other corporate bodies. Although agrarian reform was begun in 1916, progress was at first very slow. Redistribution gradually gathered momentum, but it was not until the Cardenas regime (1934-40) that it got into full swing. Cardenas restricted the possession of land which was cultivable to 300 hectares. The big estates which, up to his time, had remained untouched were carved up. Altogether some 175,000 square miles of land have been redistributed.

Land reform has been pursued through what is known as the *ejido* system. These holdings average slightly over 40 acres in size, though not all the area is necessarily capable of being cultivated. Professor James says that only about 10 acres is usually suited to cropping.* This means, in effect, that the plots are far too small to be economic and, in order to provide an adequate income for his family, the ejidatario is compelled to take another job and to leave his wife to look after his land. To solve this problem the Government has introduced the co-operative system. The peasants have been urged to join these co-operatives, and a certain amount of pressure has been brought to bear upon collectivisation. A measure of success has followed this policy, and there are now several thousand collective ejidos scattered all over the country. Ejidos now own about a third of Mexico's agricultural land. In many areas the collective ejidos are the dominant form of rural organisation. Some of these are of considerable size, as many as 3000 peasants having pooled their land. While many of the peasants have joined these co-operatives under economic necessity, it is doubtful whether they are successful from the human point of view; doubtless most of the peasants would prefer to work their own individual plots if they could be worked economically.

Two types of ejido are thus distinguishable: the individual plots in com-

* *Latin American States: Four Case Studies, in The Changing World*. Ed. W. G. EAST and A. E. MOODIE. London. 1956. P. 924.

munal land around villages and the combined plots of co-operating communities. Today there are more than 15,000 of these communal groups, and about half of the total cultivated land is worked under the ejido system. Thus the wheel has almost turned full circle: the traditional communal land-tenure system of pre-Columbian times has become, in a large measure, re-established.

AGRICULTURE

Some 61% of the working population is engaged in agricultural pursuits, yet arable, pastoral, and forest products total only one-fifth of the national income. Although climatic conditions allow a remarkable variety of crops to be grown, yet under 10% is classed as cropland and less than a third of the country could be adapted to crop growing. Fully two-thirds of the total state area is unfit for cultivation because of rugged terrain or insufficiency of moisture. A proportion of the arid land, now devoted to grazing, could be devoted to cropping if water supplies were made available. Projects are indeed on foot to expand the irrigated area as, for example, the Río Papaloapan scheme—Mexico's T.V.A.—which will open up an area of the coastal lowlands to agricultural development.

Authorities differ as to the area of the cultivated land, but a rough estimate might put it between 25 and 30 million acres. Even accepting the

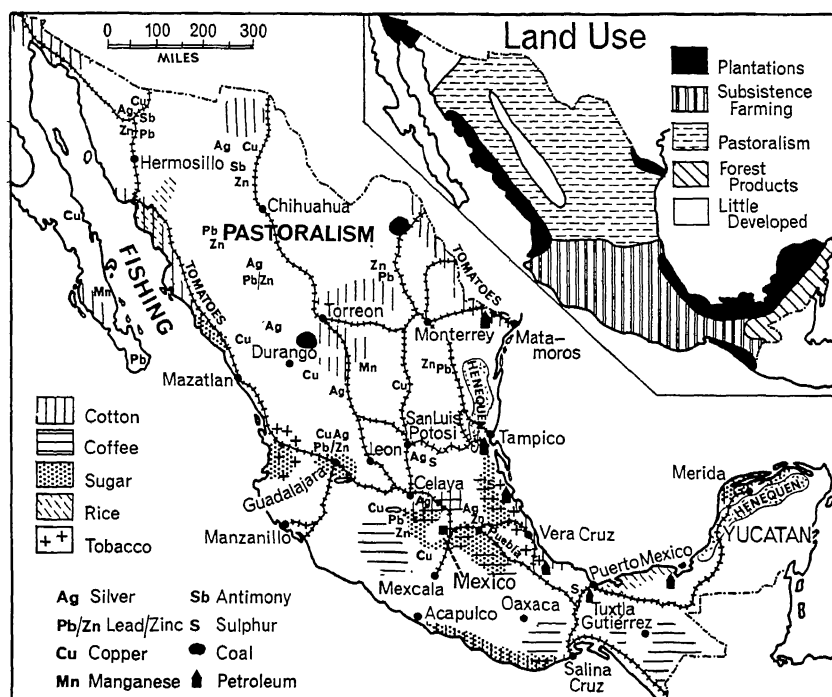


FIG. 36.—Mexico: general features.

latter figure, this works out at only 1 acre per person. Moreover, when one considers that much of the arable land, perhaps as much as a half, lies fallow and that crop yields, in general, are low, it becomes obvious that the land is being farmed inefficiently and ineffectively in view of its scarcity. Agricultural output could be, and indeed is already being, improved by increasing the irrigable area, by opening up virgin areas in the forested lowlands, by scientific crop rotation, by the use of improved seeds, by the application of fertilisers and insecticides, and by the introduction of new farming techniques. But the introduction of new ideas and the discontinuance of antiquated methods are likely to meet with some opposition, at least in certain areas, where farming practices are hallowed by centuries of well-established customs. As in so many other Latin American countries, education is, perhaps above all other national needs, *the* greatest necessity.

Although productivity in agriculture is generally low—there are exceptions to this general statement, as on some of the irrigated areas and in parts of the humid lowlands—it should be recognised that much has already been done to increase agricultural output, and this is reflected in the fact that during the period 1939–53 the volume of agricultural production generally more than doubled, while that of industrial crops alone trebled, and since then progress has continued. Cotton output, which in 1960 amounted to nearly 2 million bales from 2.4 million acres, increased four fold during the decade 1950–60. Mexican coffee production has been averaging about 2 million bags a year. Cotton and coffee are the two most important cash crops and provide approximately 20 and 10% respectively of total export earnings.

Roughly a third of Mexico is classed as pasture land; this amounts to some 200 million acres. Approximately 75% of it lies in the northern part of the country on the Northern Plateau. The stock-carrying capacity here, however, is low because of the meagre forage resulting from a light and fickle rainfall. Livestock figures for 1963 are:

| | | | | |
|---------|---|---|---|----------------|
| Cattle | . | . | . | 24.0 millions |
| Sheep | . | . | . | 6.0 millions |
| Goats | . | . | . | 11.5 millions |
| Horses | . | . | . | 5.9 millions |
| Mules | . | . | . | 3.3 millions |
| Asses | . | . | . | 3.0 millions |
| Pigs | . | . | . | 10.5 millions |
| Poultry | . | . | . | 166.0 millions |

Animal husbandry is a branch of agriculture which is receiving official encouragement, and the numbers of cattle have increased from 11.7 millions in 1940 to 24.0 millions in 1963. Other features of the cattle industry which are indicative of the progress being made include artificial insemination to improve the breeds of stock and active measures against foot-and-mouth disease and dengue fever. Sheep, which, like cattle, are

found mainly in the north, are raised principally for their meat, the wool being of poor quality. Pig-rearing is concentrated in the Central Plateau region. The large numbers and widespread occurrence of horses, asses, and mules reflect the lack of mechanisation in agriculture and the poverty of local communications.

WATER RESOURCES

Agriculture, in both its arable and pastoral aspects, has to contend with one major problem—shortage of water. There are only two low areas, the lower Gulf Coast plain and its continuation across the Isthmus of Tehuantepec and the Pacific coastal plain in Chiapas state, where there is sufficient rainfall throughout the year. The highlands that receive adequate rainfall are often unsuited to agriculture because of their rugged terrain. Considerably more than half of Mexico has not enough rainfall for successful agriculture, and in such areas any cultivation is dependent upon irrigation or dry farming practices.

Approximately 15% of the cultivated area is irrigated. The irrigated area could probably be doubled, though many of the schemes would prove to be expensive. During the past twenty-five years, but especially during the decade of the 1950's, numerous irrigation schemes were built to meet the pressing need for additional supplies of water. In the late 'thirties a great dam was built on the Río Nazas, 150 miles upstream from Laguna, to provide more water for the Laguna district, which is the republic's oldest and foremost cotton-growing area. In the states of Sonora and Sinaloa several irrigation projects, notably the one in the Yaqui valley, have been constructed. Farther south, in the states of Colima and Guerrero, rice, sugar-cane, and bananas are grown by irrigation. In the Matamoros area in the north-east, adjacent to the United States border, increased irrigation facilities have turned formerly unproductive lands into an important fruit, vegetable, and cotton-growing district.

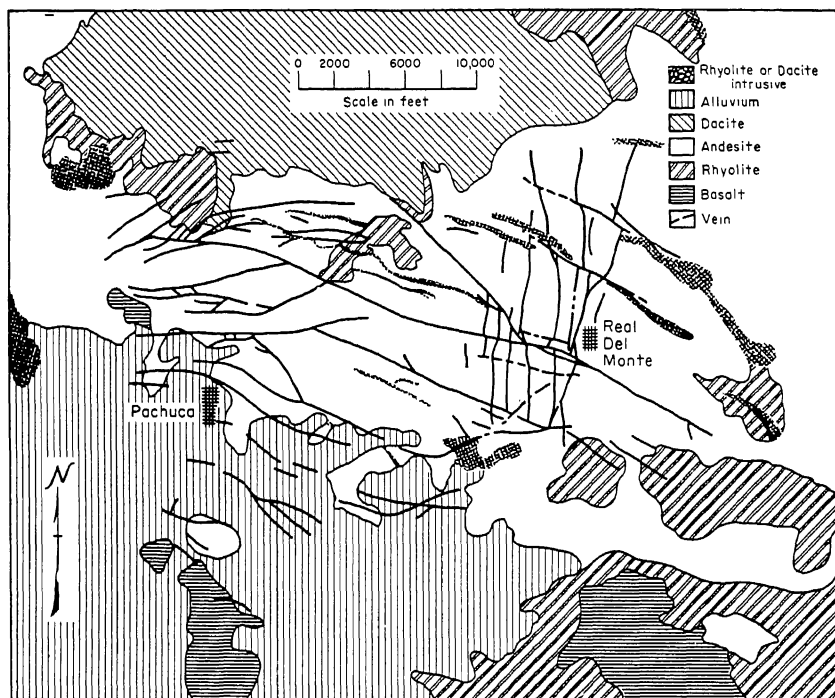
For more than a hundred years there has been considerable friction between Mexico and the United States over the waters of the Río Grande and the Río Colorado. Both these rivers are of major importance to Mexico, since they provide water supplies in two of her most arid areas. Happily these disputes were resolved by the American-Mexican Treaty of 1944, which regulates the water rights of each country and safeguards the irrigation requirements, which are of vital concern to both parties.

Altogether since 1927 some $7\frac{1}{2}$ million acres have been brought under irrigation. More projects are planned or under construction. Projects purely for irrigation purposes, however, are very costly: hence the current tendency, as elsewhere in the world, is towards the more economic multi-purpose projects which combine the provision of irrigation water with hydro-electric power generation, river flood-control and navigation, and afforestation and soil conservation schemes. Two of these projects may be mentioned. The Río Papaloapan project is a government scheme whereby the river basin, with an area of 17,000 square miles, is to be

given T.V.A. treatment involving drainage, irrigation, power, and road-construction developments. Five dams, the largest being the President Alemán Dam at Temasul in the state of Oaxaca, are under construction and, when completed, will provide sufficient water to irrigate 400,000 acres and generate electricity. The El Marques (or Benito Juárez) Dam, has already been completed. A second project, which began in 1961, is the new dam at Raudales de Mapaso in south-eastern Mexico, which will harness the Rivers Grijalva and Uzumacinta to provide hydro-electric power and irrigation water. The scheme will produce 720,000 kW of electricity. The ultimate goal is 14 million acres which, it is estimated, are capable of being irrigated and for which there are adequate and conveniently situated supplies of water.

MINERAL DEPOSITS

Mexico has long been renowned for its mines, especially its silver mines, famous since the time of the Spanish Conquest. The country is fairly richly endowed with a variety of mineral wealth. Important deposits of copper, lead, and zinc, as well as silver, occur, and these along with a number of other minerals, including petroleum, sulphur, cadmium, antimony,



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FIG. 37.—The silver-mining area of Pachuca. The silver veins, about seventy of them, occur in andesite rock and have formed in three main fault systems. The veins are normally 3–5 ft wide and rarely extend deeper than 1800 ft.

and manganese, together with the recently developed uranium and titanium resources, contribute about 20% of the export earnings.

The main mineral belt runs for 1600 miles along the Sierra Madre Occidental—from the state of Sonora in the north-west to Oaxaca in the south. Another mineralised zone lies along the Sierra Madre Oriental. The oil deposits occur in the sedimentary rocks of the Gulf coastlands. Some 110,000 workers are employed in the mining industry, which is one of the main props of the national economy. Increasing attention is now being directed to the country's mineral resources, and exploration and exploitation are being pushed ahead, although the most important mines and processing plants are owned and operated by foreign concerns.

Silver has a fairly wide occurrence, and Mexico has long been the leading silver-producing country in the world, a position she still retains. Her annual output of about 40 million fine oz is approximately a quarter of total world production. Though many areas yield silver, the Pachuca district, some 60 miles north-east of Mexico City, possesses the richest deposits. Exploited as early as 1530 by the Spaniards, the district has yielded an estimated total of 1,250,000,000 fine oz, and much valuable ore still remains. The silver ores, mainly argentite, occur in some 70 veins, mostly 3-5 ft in width and up to 1800 ft in depth in andesite rock (Fig. 37).*

TABLE IX

Mexico: Mineral Wealth

(Production in metric tons)

| | 1958 | 1962 |
|-----------------|-----------|-----------|
| Gold . . . | 10 | 8 |
| Silver . . . | 1,480 | 1,255 |
| Copper . . . | 64,963 | 47,134 |
| Lead . . . | 201,034 | 193,258 |
| Zinc . . . | 224,105 | 250,630 |
| Antimony . . . | 2,747 | 4,765 |
| Arsenic . . . | 3,095 | 12,000 |
| Bismuth . . . | 189 | 1,000 |
| Cadmium . . . | 769 | 776 |
| Manganese . . . | 78,650 | 167,074 |
| Mercury . . . | 777 | 624 |
| Tin . . . | 552 | 539 |
| Selenium . . . | 48 | ? |
| Iron . . . | 581,000 | 1,100,000 |
| Sulphur . . . | 1,300,000 | 1,202,000 |
| Coal . . . | 1,410,000 | 1,800,000 |
| Graphite . . . | 19,562 | 28,794 |

Silver is frequently found in association with lead, zinc, and copper, and these three metals are now, individually, more important than silver. Numerous silver districts in the state of Chihuahua in northern Mexico have rich lead-zinc ores. Large copper mines are worked in the state of

* RILEY, C. M. *Our Mineral Resources*. New York: John Wiley & Sons. 1959. Pp. 142-3.

Sonora. Mexico ranks third among the world producers of lead and zinc. She also holds third place as a producer of antimony and mercury. Cadmium, which is used as an alloy, is obtained as a by-product from the smelting of zinc ores, and Mexico holds second place, after the United States, in world production.

Iron-ore deposits are fairly widely distributed, and there is an estimated reserve of at least 500 million tons. Important deposits occur in the vicinity of Durango (the iron mountain, Cerro de Mercado) and at Colima. Recently nearly 50 million tons of high-grade iron ore with a low sulphur and phosphorus content have been proved in the state of Chihuahua. As these deposits lie 120 miles from the nearest railway there is no immediate prospect of their development. Currently the iron-ore production of Mexico runs at about 1 million tons annually.

Mexico is not especially favoured with coal deposits, though she does possess both bituminous and anthracite coals. The states of Coahuila and Oaxaca contain the principal bituminous deposits, Sonora the main anthracite deposits. The bulk of the coal output (about $1\frac{1}{2}$ million tons a year) comes from the Sabinas Basin in Coahuila.

About $1\frac{1}{2}$ million tons of sulphur are produced annually: most of it now derives from the salt domes around Minatitlan in the Isthmus of Tehuantepec. This puts Mexico amongst the world's largest suppliers.

Table IX gives the output of the chief minerals.

OIL AND NATURAL GAS

Petroleum is Mexico's most important mineral and warrants fuller treatment.

The oil deposits occur along the eastern margins of the country in the Gulf Coastlands. There are three main areas:

(1) the North-eastern Area around Reynosa near the border with Texas, where oil was found in 1948 and which is rich in gas fields;

(2) the Central Area with three distinct areas—(a) the Panuco area, just north of Tampico, discovered at the beginning of the present century; (b) the Poza Rica area in the hinterland of Tuxpan, where there is the famous New Golden Lane field, discovered in 1952, and the new Ordoñez-Ocatepec field producing heavy oil; and (c) the new field found at Angostura in 1953 situated 50 miles from Vera Cruz;

(3) the Southern Area, where oil was first discovered in 1911, and where there are two main oil districts, one around Minatitlan, the other around José Colomo.

Oil was first discovered in Mexico in 1901 in the Tampico area. The fields proved to be astonishingly rich. One well, the renowned Potrero del Llano well, produced over 100 million barrels of oil during the first 20 years of its existence. The Central fields yielded superabundantly and led to the Mexican oil heyday of the early and middle 'twenties, when the republic ranked second only to the United States as a world producer.

Output reached its peak in 1921 with 193 million barrels. Exhaustion of the wells brought a fairly rapid decline in production between 1925 and 1929, and during the years of the great world depression (1929-33) production was reduced to about 35 million barrels a year. By 1938 Mexico had dropped to seventh place among the oil-producing countries. In that year the Mexican Government expropriated all the foreign-owned oil properties. Since that date all drilling, production, refining, and distribution has been in the hands of *Petroleos Mexicanos* (Pemex for short), a monopolistic government department. During the post-war period exploration for oil, with successful results, and foreign loans have resuscitated the industry, and output has increased from 72 million barrels in 1950 to 132 million barrels in 1963.

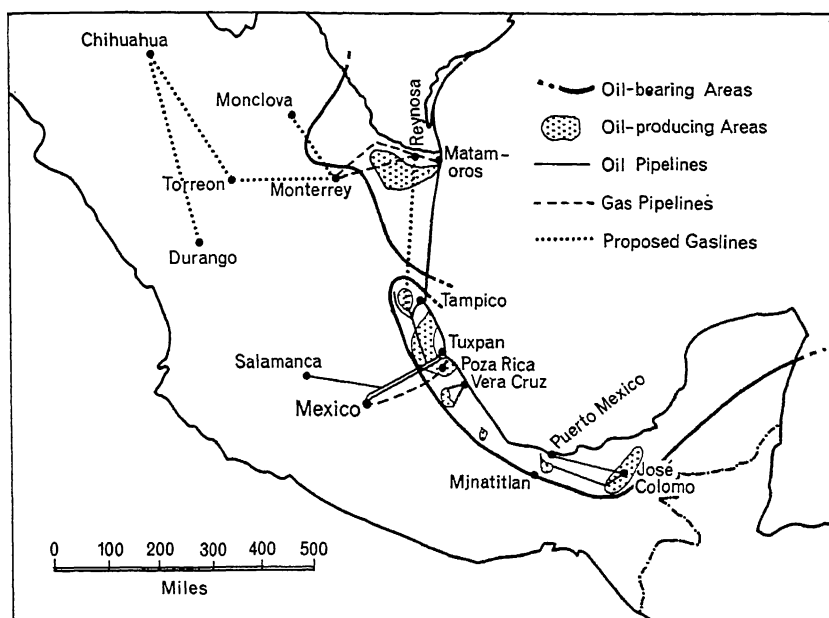


FIG. 38.—Oil and natural gas in Mexico.

Of the daily production, some 300,000 barrels (over 90%) are refined. In addition to the refineries in the Tampico-Tuxpan area, a new refinery was opened in Minatitlan in 1956, a second catalytic cracking plant was established in Mexico City shortly afterwards and a further refinery at Salamanca to the north-west of the capital. However, despite expanding production, consumption of petroleum is growing more rapidly than output, and it would appear that Mexico, notwithstanding her huge proved reserves of some 2,500 million barrels, will never again become the oil exporter she was during the 'twenties.

Besides oil, Mexico has large quantities of natural gas, which she is tapping and using on a considerable scale. Indeed, it is estimated that oil

and gas together account for approximately 90% of Mexico's total energy consumption. Gas is already piped from Poza Rica to the capital and to Guadalajara in western Mexico; also from Reynosa to Monterrey. The gas pipeline between Pemex City and the capital, begun in 1958, was opened in 1961. This pipeline, which is over 500 miles long and has to traverse both marsh and mountain, is a triumph of engineering. A point worth noting is that since Mexico suffers from earthquakes, the piping of gas is not without its risk. In 1958 a great gas-absorption plant with a daily capacity of 300 million cu. ft was opened in Pemex City. There are plans to extend the gas pipeline network to all corners of Mexico. (See Fig. 38.) Mexico ranks fifth in the world as a producer of natural gas; output is about 10 million cubic metres annually.

INDUSTRIALISATION AND MANUFACTURES

Industrial development has characterised Mexico since the end of the First World War, but during the inter-war period expansion was slow and was confined principally to the capital. The Second World War, which denied Mexico many of its imported manufactures, provided a great stimulus to internal industrial development, and since 1940 expansion has been rapid and is continuing with growing momentum.

The Government is fostering industrial development for three principal reasons: first, because, in spite of much progress in agriculture, geographical conditions set definite limits to what is possible; secondly, the population is growing rapidly and industry will provide employment for the excess numbers incapable of being absorbed on the land; and, thirdly, industrialisation will broaden still further the basis of the economy and make the republic more self-sufficient.

Mexico is fortunate in possessing a wide variety of agricultural, forest, and mineral materials and mineral fuel and water-power resources. She also has a plentiful supply of cheap labour. On the debit side are the low purchasing power of the bulk of the people, the overall inadequacy of the communications system, and the threat of a shortage of power. Reference has already been made to the fact that Mexico is at present dependent, to the tune of 90%, upon her oil and gas resources for her energy requirements and, as the demand for power continues to grow, she may well be compelled to seek alternative sources of energy.

Industrial production so far has been concerned mainly with consumer goods for the home market, *e.g.* clothing, footwear, furniture, household utensils, soap, food products, and drink. More recently, however, there have been two notable developments: heavy industry has made its appearance and Mexico has broken into the export market. Of the heavy industries, ore smelting and refining apart, the iron and steel, chemical, and cement industries have made rapid strides. The steel-making industry, 75% of which is located at Monterrey, has a current capacity (1966) of about 2.5 million tons a year; the plan to step this up to 10 million tons by 1968 is unlikely to be achieved. The petro-chemical industry is developing

fast. Production of certain commodities, notably textiles, electrical goods, and wood products, is sufficient to support an export trade and Mexico is now exporting these and a number of other manufactures.

About 15% of the working population is engaged in manufacturing industry. That a much larger industrial development with an expanding heavy industry will take place seems assured. Since 1955 industrial production has risen by about 10% a year. Mexico City is the great industrial centre of the country and has a great variety of manufacturing establishments. Prior to 1940 industry was very largely confined to the capital; since then it has spread to other towns, chiefly on the Central Plateau, although new industrial centres are now springing up elsewhere as, for example, in Tabasco state. The rapid industrial expansion of Mexico is reflected in the output of electricity which has increased from 4,423 million kWh in 1950 to 17,251 kWh in 1965.

COMMUNICATIONS AND TRADE

Mexico has some 15,000 miles of railway, originally constructed by British and United States companies but now under state control, and the entire system is being re-organised and re-equipped. Extensions in the eastern and south-eastern parts of the republic have been constructed or are being planned: for instance, in 1950 the South-Eastern Railway was opened, providing the first land communication between the peninsula of Yucatán and the rest of the country.

There is a slightly greater road mileage—totalling about 20,000 miles in 1960—though this is inadequate for the country's needs. A metalled highway, running from the United States border to Mexico City and planned as part of the Pan-American Highway, was opened in 1936. The extension of this road as far as the Guatemalan border was completed in 1950.

Adequate transport facilities and communications are a vital necessity for economic development, since the products of field, forest, and mine can only be exported—even used internally—if there are means and methods of transport. Since such facilities still lag behind the country's needs, the Government is directing attention to the improvement of the rail, road, and air transport systems. Mexico is also building up a merchant fleet.

The bulk of Mexico's trade is with the United States, which takes about 66% of Mexico's exports and supplies about 66% of its imports. Mexico's other chief trading partners are, in order, West Germany, Great Britain, and Canada. The imports consist principally of machinery and industrial equipment, and such raw materials as wool and rubber. The chief exports are, in order of value, minerals, raw cotton, sugar, coffee, shrimp, petroleum, cattle and meat, henequen and tomatoes.

MEXICO: REGIONS (Fig. 39)

LOWER CALIFORNIA AND THE SONORAN DESERT

Enclosing the Gulf of California are Lower California or Baja California, a long, lean, southward-pointing peninsula some 750 miles in length and 30-150 miles in width, and the Sonoran Desert on the western coast of the mainland stretching southwards to Cape Corrientes latitude 20 degrees N. These two areas are really extensions of the Great American Desert. They are the most remote and least-important parts of Mexico, and together contain less than 5% of the population.

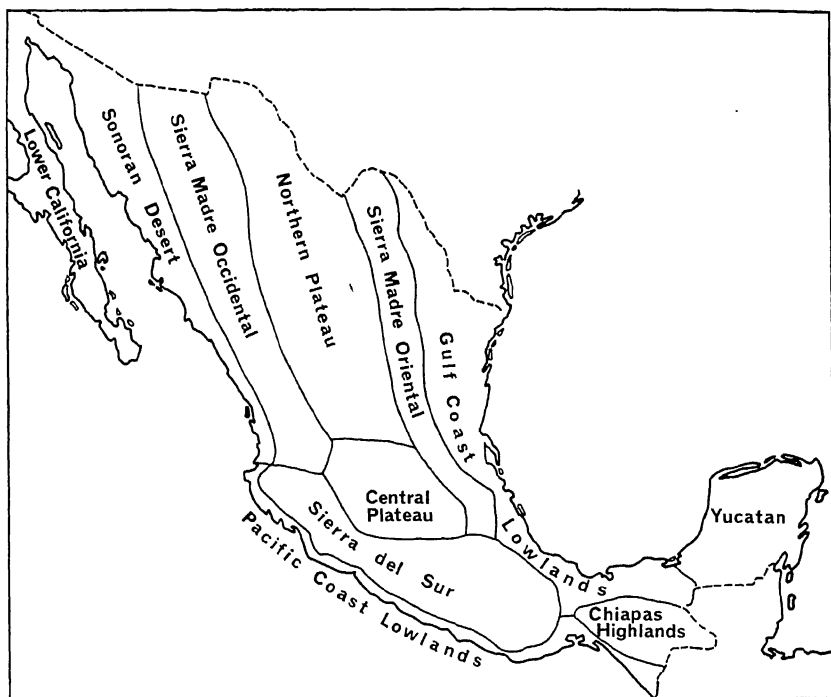


FIG. 39.—Geographical Regions of Mexico.

Lower California is a mountainous peninsula with steep slopes often ending in cliffs on the Gulf side, but sloping more gently towards the Pacific. It is warm and arid, with some parts receiving no rain at all for two or three seasons together. Much of it is bare and barren and, apart from a few pine forests on the high ridges, the vegetative cover of grasses and bushes is sparse. Botanically, however, it is a region of considerable interest: "This peninsula," wrote Smith and Phillips, "has thrilling interests for the botanist. Desert plants are not primarily desert plants. They are adjusted forms of plants from adjacent regions that have been able to work their way in. Therefore this desert is particularly rich in

modified flora, some of which is found in this desert only.”* Because of the lack of rainfall there are few streams, and this, of course, militates against the possibilities of irrigation.

Lower California is a rugged and barren, hot and parched land, and just after the First World War the total population, consisting of Indians, a few oasis dwellers, and a scattering of miners, numbered not more than 33,000. By 1930 the population had risen to 95,000, largely it would seem as a result of the introduction of prohibition in the United States. “Prohibition in the U.S. brought it a thriving but short lived business, and the later development of tourist resorts and of agriculture have swelled the population tenfold. It doubled between 1945 and 1955.”† Formerly, apart from a few small irrigated areas depending upon water supplied by mountain streams, the most important area of agricultural activity was the extreme southern tip of the peninsula, where there was sufficient rain to grow crops of maize, beans, tomatoes, and other vegetables. However, the construction of the Morelos Dam on the upper reaches of the Río Colorado has resulted in 400,000 acres being brought under irrigation, which support cotton fields, vegetable gardens, olive groves, and vineyards. The water from the dam “has turned the Mexicali Valley into a lush miniature of the Imperial Valley across the border, in California.”‡ The commercial town of Mexicali has mushroomed to 288,000 people, while the resort town of Tijuana, which lives principally on the tourists pouring in from across the border, has a population of 200,000.

Although the bulk of the population of Lower California is concentrated close to the United States border, there are scattered settlements farther south: at Santa Rosalia, where copper is mined, at San Jose del Cabo, a small port which exports onyx from the Santa Catarina onyx quarries, at La Paz, the state capital and a growing tourist centre, and at a few small fishing villages along the Pacific coast, where lobsters, clams, tuna, and sardines are caught.

The Sonoran Desert lies between the Western Sierra Madre and the Gulf. Southwards the desert gradually peters out as the rainfall increases. Moreover, the mountains are higher and give rise to several streams of considerable volume that reach the sea. The possibilities for irrigation are greater here than in the peninsula, and several storage projects, such as the Yaqui Valley Project, have been put into operation. Even so, large areas of unused land remain and await development. Settlements, apart from a few mining centres, occur only along the rivers, which provide water for irrigation. In such areas oasis cultivation is carried on, and maize, chick peas, vegetables, sugar-cane, bananas, melons, and cotton are grown. Melons, tomatoes, and early vegetables are produced for export to the United States. If water can be procured for irrigation the hot,

* SMITH, J. RUSSELL and PHILLIPS, M. OGDEN. *North America*. 1942 edition. Harcourt, Brace & Co. P. 602.

† *The South American Handbook*. 1967. P. 805.

‡ *Idem*.

sunny conditions and the fertile alluvial soils greatly favour crop production.

The most important towns are Nogales (24,000), near the United States frontier, a mining centre and exporting point for the winter vegetable crops grown in southern Sonora and Sinaloa; Hermosillo (43,000), a modern city and winter resort and centre of a productive orchard area; Guaymas (19,000), a port and resort situated on a lovely bay; and Mazatlan (42,000), located on a small peninsula, which is the largest port on the Pacific coast and a commercial and industrial centre of considerable importance. These towns are linked by a railway that runs parallel with the coast as far as Guaymas through the Sonoran Desert; from Guaymas the line runs northwards to Nogales, where it links up with the United States' railway system.

THE SIERRA MADRE OCCIDENTAL

The western cordillera, which buttresses the central plateau on its Pacific flank, stretches from the United States border southwards almost to 20 degrees N. latitude and is in much of its length nearly 100 miles wide. Topographically it comprises a belt of plateaus, often fairly level on top, rugged mountains, and deeply incised valleys. These narrow gorges are called *barrancas*; frequently they attain a depth of 1000 ft. The landscape owes much to volcanic activity. The cordillera presents a bold face to the Pacific, with a succession of sharp spurs jutting out into the Sonoran Desert and equally sharp valleys cutting back into the mountains. The eastern slopes are seamed with canyons. The region is fairly dry, so that the vegetation is mainly of sparse grass and brush, except on the higher slopes, where the rainfall is sufficient to support a forest growth of pines, cedars, and oaks. Some of the plateau surfaces and mountain slopes have a good pasture cover.

The mountains are a formidable barrier to communications, and only a few trails cross them, together with one road and one railway. The alignment of the mountains causes highways to run parallel with the region. The road and railway from Tepic to Guadalajara—a distance of 120 miles—cross the Sierra and “during the tortuous climb up to the basin floor [of Guadalajara] pass through tunnels and over gorges with splendid views of the purple mountains. The gorges of Nayarit at Ixtlán, 49 miles from Tepic, are quite terrifying: road and rail twist and turn 1,500 feet above a dizzying gorge, with wild and frightful views of rugged chaos.”*

Not surprisingly, this dry, rugged, and broken country with little arable land and practically no communications is thinly peopled and little utilised. Such settlements as exist are small Indian communities or mining communities. The Indians live in scattered groups in isolated, inaccessible valleys: some, indeed, are said to follow a nomadic existence hunting the animals of the mountains. The Indians are primitive and almost untouched

* *The South American Handbook*. 1967. P. 767.

by modern civilisation; they contribute nothing to, and may be said to live entirely outside of, national life.

The old rocks of the Sierra Madre Occidental are rich in minerals—gold, silver, copper, lead, zinc, and antimony—and it is this hidden wealth which offers the greatest prospects for the future development of the region. Some mining is already carried on on the western slopes, the ores being transported by pack-mules down to the small ports on the coast.

The region is likely to continue to be a thinly inhabited area of limited economic value for several reasons: rugged topography, lack of cultivable land, small and fickle rainfall, isolation, and inaccessibility—all of which discourage settlement and economic development.

THE NORTHERN PLATEAU

The Northern Plateau, or the Mesa del Norte as the Mexicans call it, bears a strong resemblance to the Basin and Range Province or Great American Desert of the United States, of which it is, in fact, merely a continuation. Physically, the Northern Plateau consists of basins and plains separated by low mountain ranges with occasional high peaks, some of volcanic origin. Much of this extensive region, which covers almost a third of the total area of Mexico, suffers from an insufficiency of rainfall; almost everywhere the precipitation is under 20 in., while towards the north it diminishes rapidly and in the Laguna basin amounts to only 8 in. Much of the northern area can indeed be classed as arid or at least semi-arid. The moisture situation is aggravated by the fact that most of the rain comes during the months of July to September and is torrential in type. Because of the lightness and seasonal character of the rainfall, there are few large permanent rivers; several intermittent streams do exist, however, and usually terminate in salt flats in the basins. Shortage of moisture means that cultivation is seldom possible except where irrigation is feasible. Nevertheless, there is usually enough rainfall to support coarse grasses and xerophytic shrubs. Trees occur only in patches on upstanding heights which catch relief rains, or along permanent watercourses.

Cultivation on the Northern Plateau is restricted to a few favoured areas, such as the upper part of the Río Salado valley, which, as a result of its eastward aspect permitting moisture-laden air streams to penetrate inland, is a wheat-growing area, and the Laguna basin, where irrigation is possible through the water supplies brought by the Río de Nieves and the Río Nazas. The Laguna basin is an irregular hollow, ringed round by mountains, which formerly contained a lake. The old lake bed, some 100,000 square miles, is the most important area of irrigation in the Northern Plateau region and the location of Mexico's chief cotton-growing district. Other cash crops are istle, which gives a fibre used in the manufacture of rope, sacking, and brushes, and guayule, which yields a gum similar to rubber. The other leading crops are maize, wheat, beans, and alfalfa—all cultivated under irrigation. Torreón (211,000) is the chief

town and marketing centre of La Laguna. It is a focus of railways: from Mexico City in the south, from the United States in the north, from Durango and other mining centres in the south-west, and from the fertile Salinas valley to the east. Torreón has textile mills, processing the locally grown cotton, flour mills, and smelters. Cultivation of cereals without irrigation is practised in the neighbourhood of Saltillo (50,000). Gutom Palacio, south of the railway centre of Monclova, is a growing industrial town.

Over most of the Northern Plateau the land, without irrigation, is fit for little other than grazing. The pastures, however, furnish adequate feed for large herds of cattle. This is the land of the *hacienda*, the great ranch estate usually owned by Spaniards who held almost feudal powers over the *peons*, the cowboys, and labourers. Agrarian reform during recent times has now substantially modified the position. Many of the great estates, sometimes 1 million or more acres in extent, have been taken over by the State or subdivided into smaller units. Some great estates do continue to exist. Cattle, sheep, and goats are reared. Most of the cattle are of local stock and mediocre quality, but some ranches have attempted to improve their breeds and stock Hereford and Shorthorn cattle. Important as grazing is on the Northern Plateau, it is considerably handicapped by the long dry season, the variable rainfall, the inadequate water supplies, the poor forage in summer, and the poverty of communications in some areas.

Mining has long been the most prosperous activity of the Northern Plateau. Metamorphism along the flanks of the Sierras, resulting from the intrusion of igneous rocks, has led to concentrations of gold, silver, copper, lead, zinc, and bismuth. San Luis Potosí, Zacatecas, Aguascalientes, Parral, and Chihuahua all originated or grew to importance as mining towns. San Luis Potosí (180,000) has long been famed as the centre of a rich silver-mining district; today it has many smelters, refineries, factories, and mills. Durango (59,000) has iron and copper mines. Aguascalientes (150,000), literally "warm waters," was founded in 1575. Besides its mineral springs, Aguascalientes is interesting because the town is built above an intricate system of underground tunnels, the work, so it would seem, of an early unknown people. Towards the north-west is Parral (25,000), the principal mining centre in the Bolson de Mapimi. A little farther north is Chihuahua (200,000), centre of a rich silver-mining district. In the northernmost province of Coahuila coal is mined.

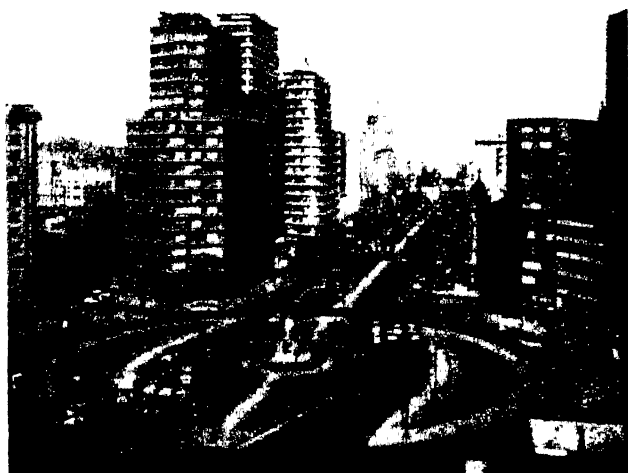
The Northern Plateau has been described as a "seedbed for revolution" and as "an area of surplus population." The light and fluctuating rainfall periodically causes distress and hard times to the pastoralists, and these in former times were prone to blame the Government for their misfortunes. Perhaps, too, as Smith and Phillips have suggested, "revolutions arise on the plateau, in part at least, because of the nervous irritation of hot and stifling winds, a fact which is recognized in the Spanish saying 'Ask no favour while the solano blows.'"^{*} Certainly in the past many of the

^{*} *North America*. 1942 edition. P. 562.

Mexican revolutions had their source on the Northern Plateau. Periodic stresses causing unemployment on the ranches and farms or in the mines and towns have resulted in the migration of large numbers of people either to other parts of Mexico or to the United States. The future of northern basins depends to a very large extent upon the provision of water supplies. Opportunities for storing and tapping water do exist, and extended irrigation facilities could increase considerably the agricultural area.

THE CENTRAL PLATEAU

The Central Plateau or Mesa Central is the southern section of the great intermontane plateau lying between the Sierras. This triangular plateau gradually increases in elevation as it narrows southwards so that the Central Plateau region lies at a height of 6000–8000 ft. This portion of Mexico, though only small in area—about one-seventh of the national territory—is the political and economic core of the country. Taking all things into consideration, it has a highly favoured environment and accordingly possesses half of the population. The region's surface features



[Courtesy: Mexican Embassy.]

FIG. 40.—Columbus Circle, Mexico City. Note the modern American glass and concrete skyscraper influence and the wide boulevard with its twin carriageway. In the background the hills surrounding the capital can just be discerned.

consist of level basins and deep valleys separated by hill ranges and volcanic cones, the whole encircled and hemmed in on almost every side by high and rugged mountains. The plateau is watered by permanent streams which come down from the surrounding highlands, which tower 2000–4000 ft above it. In times past volcanic activity and lava flows blocked up

stream outlets and led to the creation of lakes in basins and valleys; these old lake beds now provide areas of extremely rich and fertile soil, *e.g.* the "valley" of Mexico and the area around Lake Pátzcuaro.

The region too possesses the most temperate climate in Mexico: the plateau is high enough to be cool and healthful. Winters are cool and sunny, with temperatures averaging about 54°F (12°C) in January; summers are warm, with average temperatures in the mid-60s. May is usually the warmest month, before the summer rains commence. Though quite hot in the sun by day, it can be cool in the shade, while the nights are always distinctly cool. It is seldom cold, even in winter, although occasional frosts may be experienced. Typically, however, the climate is truly temperate, and Mexico City, for instance, has an annual temperature range of only 10°F . The valleys and basins receive between 20 and 30 in. of rainfall; the mountain slopes appreciably more. The bulk of the precipitation comes during the summer months, at the requisite time for crop growth. Should the rainfall be insufficient for crops, it can be supplemented by irrigation water provided by the mountain streams.

The coincidence of warmth and hot sunshine with rainfall during the summer months is favourable to cultivation, and these climatic conditions in conjunction with the rich alluvial, lacustrine and volcanic soils make the Central Plateau Mexico's premier agricultural region. Here, indeed, is found approximately one-third of the total arable acreage of the country, which supports nearly half the farmers. But in spite of this, the amount of good agricultural land is limited, a fact which has led to considerable overcrowding on the land. A diversity of crops is produced owing to the range of altitude found within the confines of the Central

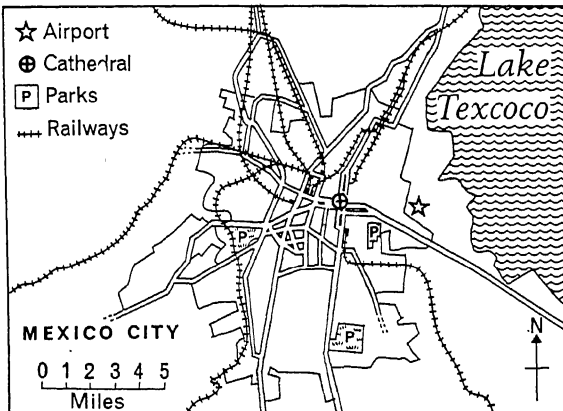


FIG. 41.—Plan of Mexico City. Situated to the west of Lake Texcoco in the Valley of Mexico on the great Central Plateau, Mexico City is regularly laid out with the cathedral, national palace, and other municipal buildings built around a large square, the Plaza Mayor. Broad avenues cut through the city, but there are many narrow congested streets. The architecture is both Spanish Baroque and modern, and Mexico City is rapidly becoming a city of skyscrapers.

Plateau. In addition to maize, which is the chief crop, and the temperate cereals, wheat and barley, large quantities of potatoes, onions, beans, chick-peas, vegetables, and fruits are produced. Alfalfa and other fodder crops are grown, for the region is also important for animal husbandry. The mountain pastures support both dairy and beef cattle, sheep, goats, and pigs. The maguey plant (the Mexican aloe or agave) grows over wide areas on the drier hill slopes: from its sap a mildly intoxicating drink, known as *pulque*, is made, while its stalks yield a useful fibre. Whereas subsistence farming is characteristic of many areas and Indian village settlements are numerous, the huge population of Mexico City has fostered the development of commercial agriculture. The capital and other urban centres are requiring increasing quantities of meat, milk, eggs, fresh fruit, and vegetables.

Since the days of the Conquest the Central Plateau has been important for its mineral riches and the region is studded with mines. Silver was long dominant and is still important, although other ores of lead, zinc, copper, antimony, and tin are produced in significant quantities. Many of the numerous small towns in this region owe their beginnings to local mines. In contrast, modern factory manufacture is of relatively recent origin. True, there is a long tradition of handicraft industries, e.g. lace and embroideries, coloured blankets, tooled leather, hand-beaten silver, and these are still practised; but factory industries, based predominantly upon local resources, such as foodstuffs, hides, cotton, wool, tobacco, etc., have grown up. They are dependent upon water power, since coal and oil are not available locally and the cost of transporting them to the region is uneconomic. The Central Plateau now accounts for about two-thirds, by value, of the total output of factory-produced goods. The chief manufacturing centre is Mexico City, but Guadalajara and Puebla are also industrial cities of note, whose importance is still growing.

The dominant fact in the human geography of the region is Mexico City. Together with its suburbs, the city now has a population of 5,000,000: "it towers like an overgrown giant above all Mexican cities, a true capital city."* Historically it has always been a big city, but its phenomenal growth has been a matter of the past fifty years: in 1910 its population was 471,000, in 1930 1 million, in 1950 over 2 millions, and a decade later over 4 millions. What is the explanation of this spectacular growth? A number of facts may be adduced: (1) its historic momentum, which early gave it the lead over all other Mexican cities; (2) its function as the national capital and seat of government; (3) its situation in the most temperate, fertile, and one of the richest areas in the country; and (4) it is far and away the greatest manufacturing centre in Mexico.

Mexico City lies on a lacustrine plain at the southern margin of the plateau. This plain is known as the "valley" of Mexico. Near by is the brackish lagoon of Lake Texcoco. The original Aztec capital lay, in fact, on an island within such a lagoon. The City was approached by four

* SMITH and PHILLIPS, *op. cit.*, p. 922.

causeways. One of modern Mexico City's main avenues follows the line of one of these causeways. The gradual drying out of the lake floor has led to subsidence, and many of the capital's big buildings have been troubled by this shrinkage in the subsoil. The capital is not merely the political and administrative centre of Mexico but also the educational, cultural, commercial, and industrial focus of the country. It has developed as one of *the* great manufacturing towns of Latin America; among its many industries the processing of foodstuffs, drink, textiles, printing, tobacco, and iron and steel manufactures are the most important. The capital, too, has become the communications hub of the republic. In early times the site was the focus of the natural routes that crossed the plateau, and latterly all the main highways and railways have been made to lead to the capital.



[Courtesy: Mexican Embassy.]

FIG. 42.—Mexican fishermen using “butterfly” fishing-nets on Lake Pátzcuaro. Whitefish from the lake is a delicacy.

Although Mexico City overshadows all the other towns on the plateau, there are a number of other centres worthy of note. Guadalajara (1,050,000), to the west, is Mexico's second largest city; it is a marketing centre, has varied manufactures, and has a growing tourist trade. Puebla (340,000) is one of the oldest and most famous cities in Mexico. Puebla lies to the south-east of the capital near to the edge of the plateau where there are water-power sites which have been harnessed to provide hydro-electricity. This locally developed power feeds the cotton mills of Puebla, which employ many thousands of operatives. Puebla is also a centre of pottery

manufacture. Half a dozen or so miles west of Puebla is the small town of Cholula; here is the great truncated pyramid of Quetzalcoatl whose base covers 42 acres. The Aztecs used this pyramid for their human sacrifices. León (275,000) is another old town, founded in 1576; it is the centre of an agricultural area and has textile factories. Other towns are Celaya (35,000), a railway junction, and Guanajuato* (25,000), a mining town and famous for its catacombs.

THE SIERRA MADRE ORIENTAL

Enclosing the Mexican plateau on the east is the Eastern Sierra, which consists of a complex of north-south ranges running from the Río Grande to the Sierra del Sur. The Sierra Madre Oriental is fairly narrow and forms a less complex barrier than its western counterpart. In the north there is little rainfall so that the land is dry and chiefly given over to grazing. Southwards the precipitation increases and around the town of Orizaba the vegetation is almost tropical in its luxuriance. Taken as a whole the region is thinly peopled yet in terms of farming, mining, and manufacturing it is of considerable importance.

There are two areas important for commercial agriculture. The first lies immediately to the east and south of Monterrey, where maize, wheat, sugar-cane, beans, tobacco, and citrus fruits are grown. The second is around Orizaba, where there is a very rich area producing a wide range of crops from rice, cacao, bananas, and other tropical fruits at lower elevations, through coffee, maize, sugar-cane, and tobacco at intermediate heights, to potatoes, beans, onions, and temperate fruits at still higher altitudes. Much of this produce finds markets in the Mesa Central, while some of it goes to the coastal cities. Besides this commercial farming there is also subsistence agriculture carried on by farmers who till small plots using simple implements and inefficient methods and who live a poverty-stricken existence.

Like its counterpart in the west, the Sierra Madre Oriental possesses considerable mineral wealth, notably ores of copper, lead, and zinc, and the precious metals gold and silver. Here, too, in the north is the Sabinas coal basin, which produces some 86% of Mexico's coal, and the smaller adjacent fields of Saltillo and Fuente.

Monterrey (825,000), founded in 1560, lies in a gap in the Sierra cut by the Santa Catarina River. The largest and most important town of the region, it has iron and steel works, flour mills and textile factories, and is a railway and road centre. Ciudad Victoria (32,000), situated at an altitude of 1000 ft and perched on a hill on the eastern slope, is a state capital and health resort for the peoples of the near by coastal lowland. Orizaba (55,000) in the south has a sub-tropical setting with magnificent scenery close at hand. It, too, functions as a health resort for the lowlanders, but it is also a manufacturing town possessing the most important textile

* In 1880 Guanajuato had a population of 70,000. The decline in silver mining is responsible for the town's decline.

factories in Mexico. They process cotton, jute, silk, and rayon. In addition, there are railway workshops, paper mills, and breweries.

THE GULF COAST LOWLANDS

The coastal lowlands of eastern Mexico bordering the Gulf of Mexico form the *tierra caliente* zone. The northern section is sub-tropical and dry and the rolling country of the narrow plain is rather barren, covered mainly with savanna. The rainfall gradually increases southwards: from 35 in. at Tampico to 60 in. at Vera Cruz and to over 100 in. in the Isthmus of Tehuantepec. This southern part is hot, wet, and humid and has had a notorious reputation as a fever-ridden lowland. It is an ill-drained land with swamps and lagoons which form a perfect habitat for mosquitos. Malaria, yellow fever, dysentery, and other tropical diseases were formerly rife in this region, earning Vera Cruz the sombre title "The City of the Dead." These diseases have by no means been completely eliminated. Thick tropical evergreen forest covers the moist coastal lowlands and mahogany, cedar, rosewood, ebony, and logwood are valuable timbers which are cut and floated to the ports. Cahoutchouc, or native wild rubber, chicle, and sarsaparilla are also forest products.

The Gulf Coast Lowlands are fringed to a great extent with shallow lagoons enclosed or partially enclosed with sandbars and spits. These coastal features, together with the unpleasant climate and the dense forest growth, have militated strongly against the economic and commercial development of the coastal lowlands, and to this day there are few ports along the Gulf Coast.

Apart from a few concentrations of population, the *tierra caliente* is a sparsely peopled region. And yet the products of this lowland—petroleum, timber, bananas, chicle, and cotton—account for approximately one-fifth by value of the total exports. Economic activity focuses upon three principal undertakings: petroleum extraction, forest exploitation and plantation agriculture.

In the extreme north at the mouth of the Río Grande the irrigation of reclaimed land has resulted in the Matamoros district becoming a productive area, with emphasis upon cotton cultivation and fruit and vegetable growing. Oil was discovered in this locality in 1948, and there is a gas-absorption plant at Reynosa. Along the coast salt is extracted by solar evaporation. Farther south, in the neighbourhood of Tuxpan (20,000) and Tampico (140,000), both oil-producing centres, are populous areas where commercial agriculture is carried on. Tampico itself lies in the midst of a rich sugar-growing area. There are also cotton fields, banana plantations, orange groves, and vegetable gardens. Tampico is the chief oil-receiving, oil-refining, and oil-exporting city in Mexico. Tampico lies 7 miles up the Río Pánuco, and oil-refining plants and storage tanks stretch for miles along the southern bank.

Some 300 miles farther south is Vera Cruz (175,000), the point where Cortez landed in 1519 and the site of the first Spanish settlement on the

mainland. During the Colonial Era the city was attacked and sacked by pirates on several occasions, and the great fortress of San Juan de Ulúa, built on an island 1 mile offshore, is at once a relic and reminder of those troublesome times. Vera Cruz has always been Mexico's leading port, yet it has remained comparatively small, a condition in large part explained by its not very wholesome climate and its regular epidemics in the past. But Vera Cruz is now growing as a result of new oil finds near by, increased trade, and improved port facilities.

In the vicinity of Vera Cruz are extensive sugar plantations. Along the coastal lowlands to the south are ricefields. Formerly bananas were grown commercially in the humid lowlands of the Bay of Campeche, but the expropriation of the estates by the Government in conjunction with the ravages of the sigatoka disease virtually extinguished the industry. Forest products, mainly lumber and chicle, come from the thickly forested lowlands. Between Vera Cruz and Campeche in Yucatán there are only two settlements of note, Puerto Mexico or Coatzacoalos and Frontera. Puerto Mexico is the outlet for the oilfields around Minatitlán and José Colomo; two crude oil pipelines run from these fields to the port. At Minatitlán is a huge refinery and a product pipeline runs to Salina Cruz, a small port on the Pacific coast.

THE SIERRA DEL SUR

The Sierra del Sur, which lies immediately to the south of the Central Plateau and from which it is clearly cut off by the great trench of the Río Balsas, is the most rugged and highly dissected region of Mexico. The topography forms a pattern of high peaks and deep labyrinthine valleys with steep slopes and little level land. The area is geographically isolated, thinly peopled, and of little economic significance. Apart from the town of Oaxaca (46,000), itself very much an Indian town, human occupation is mainly one of small Indian settlements.

Economic activity centres on agriculture and mining. Although there is some commercial production, chiefly of coffee, rice, pineapples, and limes, farming generally is of the subsistence type, primitive tillage being practised by the Indians in the narrow valley bottoms, in small basins couched in the highlands, or even on the mountain slopes. Soils are usually fertile, but there is a shortage of land fit for agriculture. Gold, silver, and mercury occur in the region, and there is a little small-scale production.

Oaxaca is the only sizeable town. Communications in this thickly wooded, broken country are scarce and often consist only of mule tracks, although the Pan-American Highway runs from Puebla through Oaxaca on its way to Guatemala. The trade of the region is small and the bulk of it goes through Acapulco on the Pacific coast.

THE CHIAPAS HIGHLANDS

The Chiapas Highlands resemble in their remoteness, isolation, and ruggedness the Sierra del Sur, but they differ from them in two respects: they

are somewhat drier, especially in their southern section, and they are in general more highly developed economically. The region is one of rugged mountains and dissected plateaus enclosing a central valley. Forest covers much of the highland, but a savanna-type vegetation characterises the valleys. The economy is concerned chiefly with the grazing of cattle on the grasslands and with subsistence agriculture. The land, when cleared, is fertile and able to support such crops as maize, bananas, coffee, and cacao. Cacao is grown on the lower Pacific slopes, and Chiapas state ranks first in cacao production. Coffee and bananas are also important crops, especially in the Grijalva valley. The Grijalva River is to be harnessed to provide electric power. The chief towns are Tuxtla Gutiérrez, the capital of Chiapas state, and Las Casas, both with populations around 25,000.

THE PACIFIC COASTAL LOWLANDS

The coastal strip from Cape Corrientes southwards to the Guatemalan border comprises the smallest of the regions of Mexico. It consists of a very narrow, constricted coastal plain fronting the Pacific which is discontinuous in places where tongues of high land from the Sierra Madre Occidental stretch out towards the ocean. The western section of the plain scarcely ever exceeds a width of 5 miles; the eastern portion is wider, varying between about 10 and 30 miles in width. Numerous short, swiftly flowing streams descending from the mountains run across the lowlands to the ocean, though few are perennial. These stream beds, together with the successive mountain spurs, make coastwise communication difficult, and west of Salina Cruz there is no railway along the coast. Neither is there any roadway between Salina Cruz and Acapulco.

The Pacific coast bears some resemblance to the Gulf coast with which it is linked by the hot, flat, forested Isthmus of Tehuantepec, though it is much drier. The rainfall averages about 20-40 in., with precipitation decreasing westwards and northwards.

The western section of the coastal lowlands is thinly peopled. Settlement is practically limited to the river valleys where irrigation is possible. In the extreme west is Manzanillo (13,000), an important inlet and outlet on the Pacific coast, which is linked to the Central Plateau by a spectacular 160-mile railway which runs via Colima. Around Manzanillo is a productive locality where rice, maize, fruit, and cotton are grown. Farther eastwards is Acapulco (28,000), an old port established by the Spaniards, Acapulco possesses a well-protected harbour but suffers from the lack of a developed hinterland and railway connections. Its recent growth and prosperity have resulted from its becoming the most popular resort in Mexico. Lagoons, fine beaches, fishing, and exotic scenery have combined to make Acapulco an attractive holiday point receiving Americans as well as Mexicans, especially in winter and spring.

East of Salina Cruz, the Pacific terminal of the isthmian railway which runs to Puerto Mexico on the Gulf coast, the coastal lowlands are wider,

the population is denser, and economic development greater. Settlements cling to the railway, which runs parallel to the coast. The inhabitants, who are mostly Indians or mestizos, earn a livelihood in a variety of ways: some by subsistence farming, some by labouring on irrigated banana and sugar-cane plantations, some by collecting coconuts, some by cattle grazing, and others by coastal fishing.

YUCATÁN

The peninsula of Yucatán is a limestone lowland. Rainfall, brought by the trade winds, averages about 30–40 in. in the northern part of the peninsula, but increases rapidly southwards. In spite of what appears to be a reasonable precipitation, northern Yucatán is classed as being semi-arid. The reason for this is the ineffectiveness of the rainfall, an ineffectiveness resulting from a combination of factors: the seasonality of the rainfall, which is confined to the June to October period; the high rate of evaporation due to the high summer temperatures when the sun is vertical; and the porous limestone soils and the fissured bedrock which drain the surface moisture away quickly. The karst topography of northern Yucatán with its thin, stony, poor soil supports only an impoverished natural plant cover chiefly of xerophytic shrubs and patchy savanna. Interiorwards, however, this grass and scrub vegetation grades into dense, impenetrable forest. Water supply presents a problem in the dry karstlands and has to be obtained by tapping sub-surface supplies; many of the houses, in fact, have wind-pumps installed on their roofs.

Some Indians scratch a poor living from the poor soils, but the economy of the semi-arid karst country is dominated by the large-scale production of henequen. Henequen, a species of agave or yucca, is a fibre-yielding plant which originally grew wild in this dry country but is now raised on plantations. The industry developed towards the end of the nineteenth century with the growing demand for a cheap but strong twine. During recent years the industry has been at a low ebb but is now showing signs of recovery. Mexico produces above 100,000 tons a year, which makes up approximately 90% of the total world output. Mérida (187,000), the eleventh largest town in Mexico, is the collecting and marketing centre for henequen. Mérida is sometimes called "the town of windmills," for there are said to be 15,000 windmills in the city. The chief port of the north is Progreso, which ships the baled henequen, mostly to the United States.

South of Progreso on the western coast of Yucatán is Campeche (31,000), a delightful, interesting, and beautifully set town. "It was the very first town in which the Spaniards set foot, in 1517. In the 17th century it was fortified against pirates and still has the air of a fortress, for the walls and an ancient fort near the crumbling Cathedral remain. Its old houses are warmly coloured in pink and red and yellow. The town, amongst hills, looks out to the Gulf and is built over a series of large subterranean caves used of old as catacombs. The rocky beaches are strewn with beautiful shells. The people fish, trawl for shrimp, weave Panama hats in

the damp caves, carve curios and make combs from tortoiseshell. It is a fascinating experience to watch the potters make the *Cántaros* (in which water is cooled) without the aid of a potter's wheel; they twiddle the base of the pot with their toes while they almost plait the body of it with strands of clay."*

The flat, streamless, tangled scrubland of northern Yucatán merges into jungle southwards. This forested country is virtually empty and economically stagnant. Apart from a little timber cutting in places, the collecting of chicle, the basis of chewing gum, is almost the sole activity, and even this is threatened by the use of synthetic substances. Interest in this area centres upon the numerous ruined structures, especially those of Uxmal, Palenque, and Chichén-Itzá, which are the relics of the wonderful Mayan civilisation which flourished here in the pre-Columbian era. The decline and disappearance of this civilisation is one of the still unresolved enigmas of history. Conquest, malaria, climatic change, and other causes have all been invoked in an attempt to explain this historic puzzle, but the truth remains elusive.

THE ISTHMIAN STATES

GUATEMALA

Guatemala, which abuts on Mexico, is the westernmost of the isthmian republics. It is roughly rectangular in shape, with a bold indentation on its western boundary and a bold projection on its eastern boundary. The state stretches from coast to coast, but only a small portion of the eastern frontier looks out on to the Caribbean Sea. It has an area of 42,042 square miles and a population of 4,438,000. It is the most populous of all the isthmian republics, and also is the most predominantly Indian. Although authorities differ over the racial make-up of the population, it is fairly safe to say that just over half are Indian, about 42% are *ladinos*, i.e. of mixed Indian and white ancestry, while the rest, 1 or 2%, are white.

Guatemala is dominated by part of the mountain backbone which traverses the western section of the isthmian region. This east-west structural trend accounts for a series of roughly parallel topographic zones. Along the Pacific coast is a narrow coastal lowland between 25 and 30 miles wide. Rising somewhat abruptly from this coastal plain is the mountainous region, which attains a general elevation of 8000–10,000 ft. The highland region is divided into two parts: the southern highlands possess numerous volcanoes and the underlying crystalline rocks are covered with lava and ash; the central highlands, though not quite so high as the former, are much more rugged, their hard, crystalline rocks having been eroded to produce fang-like peaks. The mountains are highest in the western part of the country and culminate in the volcanic peak of Mt. Tajumulco (13,800 ft). Towards the east a number of deep valleys are to be found and three main rivers flow north-eastwards and debouch into the Gulf of

* *The South American Handbook*. 1967. P. 797.

Honduras. The Río Motagua is the largest and southernmost stream. Near by, in the next valley, is the large, shallow, swampy Lago de Izabal. Lakes are a feature of Guatemala, and in one of the highland basins lies the beautiful blue Lake Atitlan. On the northern margin the mountains descend more gradually to a wide limestone plain which lies a few hundred feet above sea-level; much subterranean drainage occurs here, although extensive lakes sometimes develop after heavy rains.

Since Guatemala lies in tropical latitudes, the climate of the lowland areas is hot, but temperatures become greatly modified with altitude and are temperate in the higher regions. The *tierra caliente* gives way to the *tierra templada*, which, in turn, passes to the *tierra fria*. The North-east Trades predominate on the Atlantic side, while local monsoonal winds characterise the Pacific side. The mountains act as barriers to the winds, cause orographic lifting, and result in heavy relief rains on the windward slopes. Tropical hurricanes, which may occur on both the Atlantic and Pacific coasts, occasionally bring devastating storms. Topographic diversity produces many micro-climates. Similarly, there are great differences in the vegetation from place to place, which ranges from swampy rain-forest on the Caribbean lowlands to coniferous forest in the *terra fria* zone of the highlands.

Guatemala appears to possess few mineral resources. There is no coal. Petroleum occurs, but so far there has been little exploitation. There are possibilities of hydro-electric power development. Partly because of these facts, but more especially because of the backward nature of the economy, Guatemala has no manufacturing industry. Such manufacture as exists is domestic in nature and based on local raw materials, e.g. the weaving of blankets and the making of pottery. Soils of varying kinds occur as might be expected from the differences in geology, landforms, climate, and vegetation. Fertile volcanic soils occur in the southern highlands and on the Pacific slopes; leached lateritic soils of limited fertility are characteristic of the limestone tableland; and rich alluvial soils are found on the flood plains of the rivers. Guatemala, however, has suffered a considerable amount of soil erosion.

Agriculture dominates the economy of Guatemala. Approximately 90% of the people are engaged in farming activities, although only 10% of the total area is cultivated. Conditions of agriculture vary very much according to the environmental background, but, broadly speaking, two main kinds of agriculture are to be found, i.e. native subsistence farming and commercial plantation agriculture.

Dr. E. C. Higbee distinguished nine distinct agricultural regions.* There is not space to deal with these fine divisions and only the main features of the land utilisation will be indicated. The Petén and Caribbean lowlands, covering some 20,000 square miles and comprising almost half the country, are still largely under forest and virtually undeveloped. There

* "The Agricultural Regions of Guatemala." *Geographical Review*, April 1947, pp. 177-201.

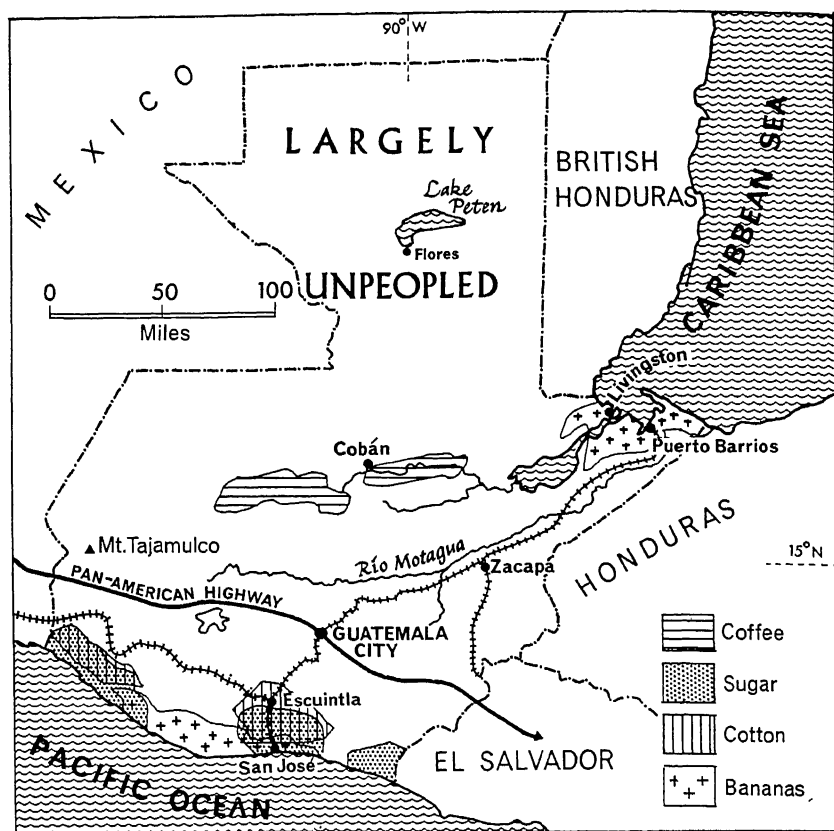


FIG. 43.—Guatemala: general features.

is a little abacá and banana cultivation on the coastal plains bordering the Gulf of Honduras, and the latex or chicle of the sapodilla, a tree common in the forests of the Petén, is collected for the making of chewing gum. The north-eastern slopes of the central highlands have many large estates producing commercial crops, such as coffee, sugar-cane, and henequen. In the basins of the highlands subsistence farming is characteristic; the bulk of the peasant farmers live here and eke out a precarious existence on small-holdings growing maize, wheat, beans, and potatoes. In the higher parts the Indians pasture sheep and grow potatoes. The Pacific slopes of the highland, with their rich volcanic soils and plentiful moisture, form the most highly productive part of Guatemala. Here the cultivation of coffee is paramount. In the Pacific piedmont and plains region conditions for crop-growing are almost equally favourable. The chief drawback is a tendency towards insufficient rainfall, especially in connection with moisture-loving plants such as the banana, and the United Fruit Company, which has large banana plantations on the coast, has had to develop irrigation. The rich, black, volcanic soils, however, are extremely fertile, and a

wide variety of crops, including cacao, sugar-cane, rice, maize, cotton, is cultivated in addition to bananas. Guatemala's best cattle ranches also occur in the piedmont zone.

Most of the people live on the plateau and on the north-eastern and south-western slopes. In the Petén and the Caribbean lowlands there are few inhabitants; most of the 25,000 or so—less than 1% of the total population—who are found here congregate in the lower Motagua valley, particularly in the small ports of Puerto Barrios and Livingston. It is interesting to note that it was in this very region, now of such little importance and so thinly peopled, that the Mayan civilisation developed and flourished between the second and sixth centuries A.D. Exactly why this great civilisation of the Mayas declined and died out is still a mystery: a change in the climate, the exhaustion of the soil, and the ravages of malaria are among the causes which have been advanced to account for its disappearance. Malaria, certainly, is endemic today in the low-lying areas of the Petén and the Pacific coast.

The people of Guatemala, except for a few, are very poor, and over half of them are illiterate. For long an aristocratic regime was entrenched in Guatemala and then, after 1839, when an independent republic was set up, the country succumbed to the rule of a series of long-lived dictatorships. During and since the Second World War, however, a series of political changes has begun to break down the old order. Although some social reforms have been introduced and some attempts have been made at land redistribution, some 70% of the cultivated land is owned by 2% of the population. In the central plateau, however, some of the land is, and has long been, in the hands of the Indians. This native landed group is an interesting feature of Guatemala and, if not unique, is surprising. But most of these subsistence peasant farmers own less than $7\frac{1}{2}$ acres. Such plots are insufficient to maintain a family under the characteristic hoe cultivation which is practised, with the result that many of the people are compelled to migrate to undertake seasonal work on the plantations and great estates. The pure-blooded Indians of the highlands have maintained a proud, semi-independence and remain untouched by modern civilisation. They look upon themselves as the aristocrats of the native peoples of Central America.

Except for Guatemala City, the capital, towns are few and small. Guatemala city (575,000), which lies in the highlands nearly a mile above sea-level and enjoys a cool and healthful climate, is a fine and beautiful town built on modern lines. It dates from 1783, when a catastrophic earthquake reduced the ancient capital of Antigua to ashes. Guatemala City is connected by a coast-to-coast railway with Puerto Barrios on the Gulf of Honduras and to San José on the Pacific coast. The only other railway runs across the Pacific slope parallel with the coast; branches lead down from this railroad to the ports of Champerico in the west and Iztapa in the east. Roads are relatively few, although one or two good highways traverse the country—the result of dictator Jorge Ubico's

passion for motor racing! In many parts of Guatemala goods are still carried by pack animals or human porters.

Just as the production of coffee and bananas dominates the Guatemalan economy so, also, coffee and bananas dominate the country's export trade, accounting, respectively, for about 80 and 10% of the total. Nearly three-quarters of the exports go to the United States. Guatemala's imports, chiefly manufactured goods, come predominantly from the United States.

EL SALVADOR

The tiny republic of El Salvador, with an estimated area of only 8259 square miles, is the only one of the six isthmian states which does not have a coastline upon both oceans. Hemmed in on the one side by Guatemala and on the other by Honduras, El Salvador extends along the Pacific coast for a distance of about 160 miles. The terrain is mostly mountainous. A narrow coastal plain is backed by two parallel mountain ranges which enclose an interior plateau having an average altitude of some 2000 ft. The mountains contain many volcanic peaks, several over 7000 ft high, some active, but the majority extinct. Izalco, breathing almost continuous flames, makes a wonderful landmark for navigators and is known as "The Lighthouse of the Pacific." Periodically earthquakes cause havoc, and as recently as 1952 the towns of Chinameca and Jucuapa were destroyed. Running through the entire length of the republic is the River Lempa, whose valley is the most important valley in El Salvador and whose value as a source of power is now being realised.

As in other parts of Central America, the climatic conditions reflect the effect of altitude. The lowlands along the coast are generally hot, humid, and unhealthy, but inland the elevation tempers the heat and the plateau is sub-tropical and the higher mountain slopes temperate. From November to April is the dry season, from May to October the rainy season. The average annual precipitation is about 80 in. Rainfall of torrential intensity frequently occurs, and occasionally spells of continuously rainy weather, lasting several days or for even more prolonged periods, take place. To these wet periods the Salvadoreans apply the term *temporal*. Not surprisingly much of the land is badly eroded.

Largely as a result of the unpleasant climatic conditions of the Pacific coastal lowlands, but also due to the fertile volcanic soils of the plateau, the upland is the essential core area of the state. Here dwell most of the people. Although El Salvador is the smallest of the Central American republics—indeed, it is the smallest state in the Western Hemisphere—it is the most densely peopled country. The total population is 2,500,000, the density over 300 inhabitants to the square mile. The pressure of population upon the small area, much of it rugged, has meant that virtually every scrap of cultivable land has been pressed into service; altogether 71% of the total area is under cultivation. Such crowding, moreover, has forced the El Salvadoreans to adopt a more intensive system of agriculture than that practised by their isthmian neighbours. These facts of high population

density, high proportion of cultivated land, and intensiveness of cultivation put El Salvador in a class apart: she stands contrasted with the other Central American republics.

Maximum use of the land and the diligence of the people have not, however, overcome the problem of over-population and the pressure has had to be relieved by migration to neighbouring countries. During recent years there has been a considerable movement of people across the frontier into more sparsely populated Honduras.

Ethnically the Salvadoreans are very mixed. The composition of the population is given as 78% mestizo, 11% white, and 11% Indian, but the three elements merge imperceptibly into one another. The Indian element and Indian culture have been largely obliterated in El Salvador, mainly as a consequence of the more highly developed economic life of the country and in these respects the republic exhibits a striking contrast with its neighbour Guatemala, where the preponderance of the Indian racial type and Indian culture are strongly marked features.

El Salvador is a predominantly agricultural country and the economy rests upon a single commercial crop, coffee. The coffee grown is a high-grade "mild" variety. About 320,000 acres are devoted to coffee, mostly occupying the slopes of the volcanoes. From the 140 million coffee trees, $\frac{3}{4}$ million to 1 million bags of coffee beans are produced annually. The country certainly has important advantages for coffee production: fertile volcanic soils, favourable climatic conditions, abundant cheap labour, a good communications network, and exporting ports in close proximity

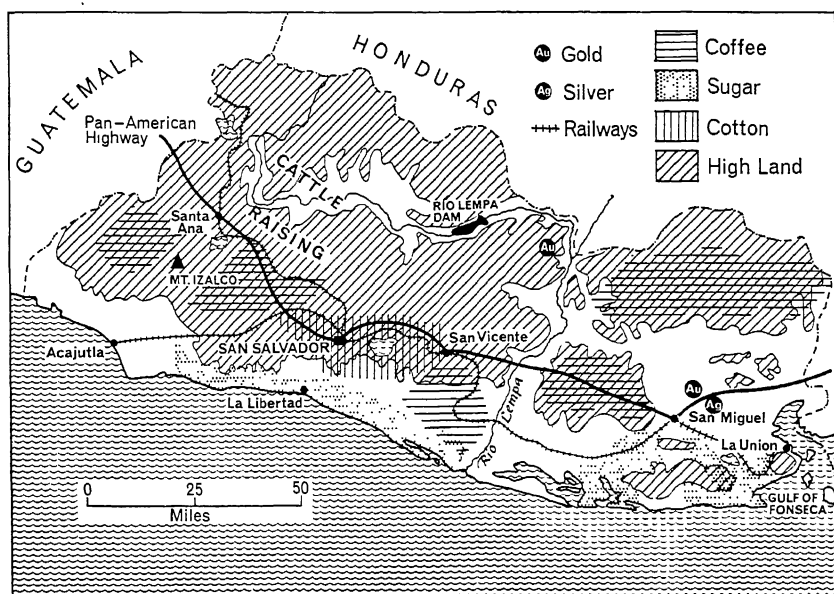


FIG. 44.—El Salvador: general features.

to the coffee-growing areas. These factors make for successful production and, also, for low cost of production.

A distinctive and distinguishing feature of coffee-growing in El Salvador is its production on small units. Though there are a number of large estates, typically the holdings are small, averaging only about 20 acres. Thus, while the wealth of the country is more widely and equitably distributed than in countries where the large plantation is dominant, there are tens of thousands of small farms which scarcely provide an adequate basis for the support of a family and certainly do not provide a margin of profit which can be accumulated to meet any economic setbacks.* Dependence upon a single crop is a very chancy business. But this is the position in El Salvador. Coffee alone furnishes, by value, 85% of the exports.

A variety of other tropical and sub-tropical crops are grown, which include maize (the chief subsistence crop, which occupies a larger acreage than coffee), rice, sugar-cane, beans, yucca, potatoes, sesame, sisal, and cotton. The famous "Peruvian balsam," a medicinal gum, is an exclusively Salvadorean product. Cattle-raising forms a significant aspect of farming: there are about $\frac{3}{4}$ million cattle. Forest and mineral resources are small and relatively unimportant.

Industrially El Salvador is much more advanced than its neighbours: in fact, its industrial establishments outnumber the combined total of those of the other Central American republics. The problems of over-population and impoverishment may be eased by industrial development. Until recently manufacturing was greatly handicapped by lack of adequate power resources, but a great hydro-electric power station has been built on the River Lempa. Investigations into the use of volcanic gases which it is reckoned could be harnessed to produce thermal electric power are being carried out. The processing of foodstuffs is the principal industrial activity, but a variety of manufacturing industries are undertaken, including cotton textiles (ten factories), the making of sisal bags, the processing of leather, and the production of footwear, cigarettes, soap, and pottery. El Salvador has recently announced that she intends to develop two major projects in the port area of Acajutla: a great oil refinery to process Venezuelan oil, and a big chemical fertiliser plant—the first, incidentally, in Central America.

San Salvador (250,000), the capital and largest town, a modern, clean, and attractive city, largely built of wood on account of the liability to earthquakes, is situated in a picturesque valley some 30 miles inland. Railways link San Salvador with the small but important coffee-exporting port of Acajutla, with the coffee metropolis Santa Ana, and with Guatemala City and Puerto Barrios on the Caribbean coast. La Unión is the chief port of the republic and normally handles about half of the import traffic and a third of the export trade.

Although El Salvador has suffered from the usual political and social ailments common to Latin American countries, the Revolution of 1948

* *World Geography*. Ed. G. KISH. 1956. P. 122.

and the New Constitution of 1950 indicate that the country is moving towards more democratic government and social equality and justice.

HONDURAS

Although Honduras has a territory of nearly 44,000 square miles, approximately equal to that of Guatemala, its population of 2,363,000 is only a little over half that of Guatemala. Although Honduras has fertile soils, is richly timbered, and reputed to be well endowed with mineral wealth, it is a poor and backward country.

Honduras bestrides the isthmian land bridge of Central America, having a frontage on the Caribbean of 400 miles and on the Pacific of 40 miles. The country is very mountainous, being traversed by the Cordilleras, which run roughly east-west and rise to peaks exceeding 10,000 ft. Within the mountains, however, are numerous small basins, fertile valleys, and broad plateaus. A transverse valley some 40 miles long and 5-15 miles wide cuts through the mountains to form the Camayagua Plain. Alluvial coastal lowlands fringe both ocean shores, though these are less well developed on the Pacific side than on the Atlantic.

Tropical climate characterises the coastal belts, and sub-tropical conditions prevail in the highlands. The northern coastal lowlands are hot and damp and rain is experienced throughout the year, although the summer half is wettest. The highlands are cooler and also less moist. At Tegucigalpa, the capital, situated in the Central Highlands at about 3000 ft, temperatures are not unpleasant, rainfall is only about 36 in., and there is a dry season extending from December to May. Much of the country is under forest and woodland—almost two-thirds of the total area in fact—hence there are large tracts of uncultivated and sparsely inhabited country. The department of La Mosquitia remains virtually unexplored and is inhabited by a few aboriginal Indian tribes.

Spanish settlement in Honduras dates from 1525, and shortly after that date the territory became part of the Captaincy-General of Guatemala. After the revolt against Spanish rule, Honduras became a member of the Central American Confederation (1823-38) and then emerged as an independent republic. For the best part of the succeeding 100 years Honduras suffered incessant civil war, and this long series of internal disturbances lies at the root of the country's poverty and its low state of economic development.

As in El Salvador, the population is mainly mixed: the mestizo element is estimated at 86% of the total. The pure-blooded Indians are small in number, some 2 or 3%, though some estimates put the Indian element at 10% of the total population. A considerable number of British West Indian Negroes, imported to work on the banana plantations, form a strong element in the coastal region of northern Honduras. Incidentally, these Negroes suffered severely when the banana industry collapsed in the early 'forties as a consequence of the Second World War and the ravages of the blight which attacked the plantations. A large number were, in



FIG. 45.—Many of the banana plantations along the Caribbean Coast were established by the United Fruit Company. Sigatoka disease ravaged and destroyed many of the plantations. New plantations have been opened up along the Pacific coastal lowlands.

fact, repatriated. Negro immigration is now forbidden. A European minority, of nearly pure Spanish descent, accounting for only about 2% of the population, constitute an aristocratic ruling class. The majority of the Hondurans are either poor peasant cultivators or labourers on the large plantations, a situation which contrasts markedly with that in neighbouring El Salvador, where there is a large wage-earning element.

Economic Development. A mere 4% of the total area is classed as arable and orchard land and a further 2% as pasture land. Yet Honduras is self-supporting in foodstuffs and exports small quantities of agricultural produce. As in Guatemala, a big proportion of the cultivated land is given over to subsistence crops, especially maize, the staple foodstuff, which covers the greatest acreage. Commercial crop-growing is chiefly concerned with bananas, coffee, and coconuts. Bananas form the great cash-crop and account for about 40% by value of the export trade. The bananas are grown on the alluvial lowlands of the Caribbean coast, and the industry is dominated by the United Fruit and Standard Fruit Companies of the United States. Prior to the attack of sigatoka, Honduras was the leading Caribbean producer of bananas. Although the disease is now under control, Honduras has not regained its former lead. Moreover, the industry has been troubled by labour problems. In the summer of 1954

there was an effective strike of the banana workers, who demanded higher wages and better working conditions. The other chief commercial activity is the production of coffee, an industry that is in the hands of small growers and which, currently, is accounting for about 25% of the export trade.

Animal husbandry is widely practised and increasing in importance. Livestock number about 2 millions, cattle making up 54%. Cattle-breeding, though not very scientifically done, is now taking place, and the numbers of animals are gradually increasing. Considerable numbers of cattle are now being exported each year to neighbouring countries.

The catching of wild animals and the preparation of skins is an interesting economic side-line. Alligator, peccary, and wild-pig skins are exported to the United States. Fisheries, though potentially important, are little developed, but Turneffe sponges have the reputation of being the finest in the world. Honduras' rich forest resources contribute little to the economy, although formerly hardwoods were an important item in the export trade. Most of the accessible timber has been cut, and further exploitation is dependent upon improved communications. The timber and forest derivatives trade could be of considerable value to Honduras.

Honduras and Nicaragua are the only states of Central America where mining is significant and enters materially into the export trade. Silver is the most important metal mined, and in recent years has accounted for about 10% of the export trade, but production has declined within the last year or two with the exhaustion of the accessible deposits. Gold, lead,

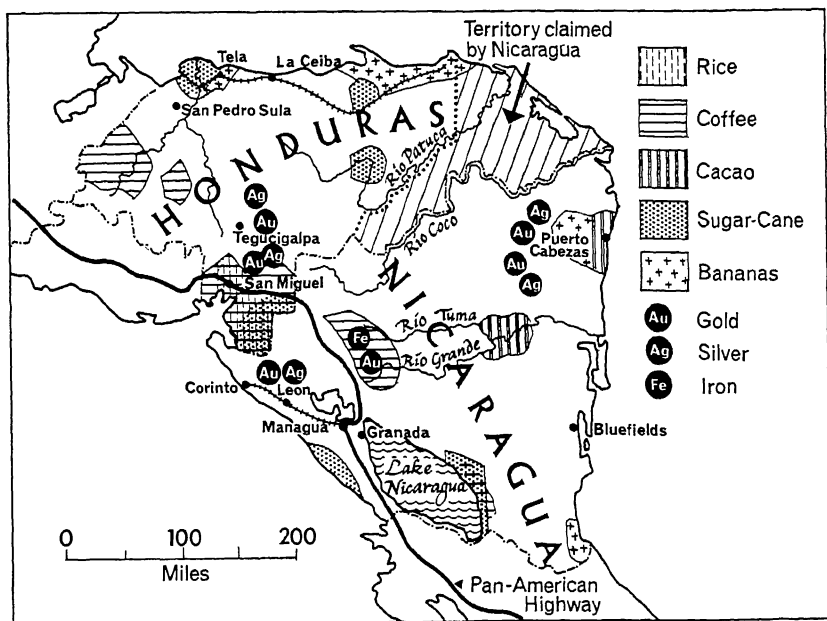


FIG. 46.—Honduras and Nicaragua: general features.

antimony, and magnesite are worked on a small scale. Considerable resources of copper and iron ore are said to exist. A little brown coal occurs also and is mined near Tegucigalpa.

Agriculture, forestry, and mining all suffer through the inadequacy of the country's communications. All told, there are only about 850 miles of railway, serving for the most part the banana plantations, and about 1500 miles of motor roads, the greater part in poor condition. Tegucigalpa must be counted among the few capitals in the world without a railway station! It is true that various attempts have been made to link Tegucigalpa with the coast by rail, but they have always come to nought. By contrast, the capital has a fine airfield, and air communications are comparatively well developed.

Honduras has only two towns of note, Tegucigalpa and San Pedro Sula. The capital owes its origin to the silver mines in the locality. Despite its beautiful setting in a highland valley, Tegucigalpa is a city of small interest. Its population is about 170,000. San Pedro Sula, with approximately half as many people, is a banana and sugar centre, and the chief, one might say only, industrial centre in the country.

No description of Honduras would be complete without a brief reference to things, one old, the other new, which are the glory and pride of the republic. Not far from the small town of Santa Rosa in western Honduras are the famous Maya ruins of Copán with their wonderful hieroglyphic inscriptions and macabre sculptures. At Zamorano, some 25 miles from the capital, is a modern, well-equipped School of Agriculture—a gift of the United Fruit Company—which has already gained a great reputation. To this centre of learning and research come students from every part of Latin America who receive three years' free tuition and maintenance.

NICARAGUA

Nicaragua's 57,145 square miles of territory makes it the largest of the Central American Republics. But its population, estimated at 1,685,000 in 1965, is relatively small for the size of the country and it is the most sparsely peopled of the five republics. About three-quarters of the population are mestizo. A small proportion, some 15%, is classed as white; some Nicaraguans are of pure Spanish ancestry. These whites form an educated and politically conscious group. Unfortunately Nicaragua suffered for a long time from political misfortune and mismanagement. In order to keep the law and to prevent political chaos the United States intervened twice in the country's domestic affairs. United States troops were in occupation between 1912 and 1925 and 1926 and 1933. For a period of 20 years, between 1936 and 1956, Nicaraguan affairs were dominated by an astute dictator, Somoza, who systematically exploited the republic for his own ends. He was assassinated in 1956.

Three well-marked physical divisions may be recognised: firstly, a highland area of mountains and plateaus flanked on the Pacific coast by a

range of volcanoes, some of which are active; secondly, a wide lowland area, marshy in parts, in the east, across which several rivers flow from the mountains to the Caribbean; and, thirdly, a long, relatively narrow depression, containing two large lakes, which runs obliquely across the country from the Gulf of Fonseca, on the Pacific, to the Caribbean. As a result of this physical diversity, there is a considerable variety of climate and products. This variety is reflected in the fact that Nicaraguan exports are much more diverse than those of the other Central American Republics.

The population is more concentrated than in Honduras and about 90% of the total throng the western part near the Pacific coast and the western shores of Lakes Managua and Nicaragua. Conditions in the west are healthier and the climate shows a fairly pronounced seasonal rhythm, with alternating wet (May to November) and dry (December to April) seasons. All the important towns are located in this populous zone, and the capital, Managua (275,000), lies on the southern shore of the lake of that name. Managua was chosen as the state capital in 1858, since it lay midway between the two rival colonial cities of Granada (40,000) and León (62,000). Managua suffered devastation by earthquake in 1931 and was severely damaged by fire in 1936. It has been rebuilt in a modern and handsome style.

The eastern lowlands are hot and humid. Since the prevailing winds blow from the north-east and from the sea they bring copious rains to the eastern part of the country: some places receive as much as 200 in. of rainfall annually. The heat and moisture are conducive to plant growth, and the lowlands are thickly forested. This part of Nicaragua long remained empty and neglected, for the heavy rainfall, humid heat, dense vegetation, and unhealthiness militated against its occupation. Apart from a few Jamaican Negroes who colonised the Caribbean coastlands there was little activity until the beginning of the present century, when the United Fruit Company of America established banana plantations in the hinterland of Puerto Cabezas. At first these flourished and 25 or so years ago 4 million bunches were being exported annually. Then sigatoka disease attacked the banana trees and ravaged the entire plantations virtually wiping out banana cultivation on the east coast. In 1949 the banana industry was transferred to the Pacific coast. The old banana plantations are now being given over to cacao cultivation. The collapse of the banana industry is illustrative of the difficulties which confront economic development in this eastern zone.

Like all the other Central American Republics, Nicaragua is predominantly agricultural and some 68% of the population live on and from the land. And yet a mere 5%, or just over 1 million acres, is cultivated. Important developments are taking place in Nicaraguan agriculture: noteworthy are continual expansion of the cultivable land (*e.g.* in the highlands around Jinotega and Matagalpa), an increase in per capita output (more than double in the past quarter of a century), and more mechanisation in agriculture (there are now over 6000 tractors in use).



FIG. 47.—Market in Nicaragua. In this market, in Managua, all kinds of products, including fruit, vegetables, hand-made straw hats, baskets, articles made from alligator skins, are for sale. Markets similar to this are to be found in Mexico and all the Central American republics.

Coffee, which is grown mainly in the neighbourhood of the capital, especially in the Sierra and Carazo districts to the south, has long been the chief cash crop but cotton, grown mainly around León, has now taken first place. Cotton accounts for 27% and coffee for 25% by value of the export trade. Unfortunately cotton growing is giving rise to serious soil erosion. Maize, sorghum, and beans are the chief subsistence crops. Small quantities of sugar, cacao, bananas, sesame, rice, and tobacco are grown. As in Guatemala, cattle-raising is relatively important and with 1,200,000 head Nicaragua is the leading cattle country among the five republics. The principal cattle district is the plains of

Chantales to the north of Lake Nicaragua, where it is a thriving industry, although during recent years cattle-raising has spread into the highlands north of Lake Managua. There are small exports of live cattle, frozen beef, and hides.

About 43% of the country is classed as forest and woodland, most of it occurring on the eastern lowlands. Timber exploitation forms the chief activity in these Caribbean plains, and a number of high-class hardwoods, of which mahogany is the most important, are exported. Three small ports, San Juan del Norte, Bluefields, and Puerto Cabezas, handle the timber trade.

Gold is an important item and accounts for about a tenth of the export trade. There are several deposits, but exploitation is handicapped by transport difficulties and present production is restricted to three localities where the richest and most favourably situated deposits occur.

Industry is very much underdeveloped and manufactures make up a mere 10% of the total national income. Most of the 500 factories are in and around Managua. Such industrial concerns as exist are small-scale and chiefly engaged in producing consumer goods. There are a number of sugar-refineries, three textile mills, a cement plant, a powdered-milk factory, brick and tile works, and workshops making footwear, furniture, biscuits, cigarettes, liquor, soap, candles, and matches. Plans have been laid for an important hydro-electric power project on the Río Tuma.

Except in the south-west of the republic, communications are altogether inadequate. There are large areas in the east and north where there are no land highways whatsoever. The only railway is the 217-mile-long track, the Ferrocarril del Pacífico, on a 42-in. gauge, which runs along the depression from Granada on Lake Nicaragua via the capital to Puerto Morazan with a southern branch line to the port of Corinto. The Inter-American Highway, a metalled road, runs from the frontier of Honduras southwards through Managua to Costa Rica. Air services link many outlying places with the capital. Lack of an adequate national communications network, however, has prevented extensive areas of valuable farm and forest land from being settled and developed.

Before leaving Nicaragua reference should be made to the possibilities it offers for an alternative canal passage across the isthmus. By making use of the San Juan River and the depression lakes, a canal could be constructed with relative ease. The United States, by agreement with Nicaragua, already holds the rights to build a canal and has already surveyed the route, but it is more than doubtful whether a canal will ever materialise.

COSTA RICA

Costa Rica, the "Rich Coast," is in many ways the most remarkable of all the Central American Republics. It enjoys the enviable reputation of being the most highly civilised and most politically mature of the republics; certainly it is the most economically advanced and the most prosperous. These conditions are doubtless due in part to the political stability

and the democratic outlook which have long been a feature of the republic and perhaps partly to its almost wholly white population.

El Salvador excepted, Costa Rica is the smallest of the Central American Republics with an area of 19,652 square miles. Physically it comprises a narrow strip of country, varying between 75 and 175 miles in width, traversed by two mountain ranges, high and rugged in parts and built up very largely of volcanoes. Many of the volcanoes tower up to heights in excess of 10,000 ft; the highest peak is Chirripó Grande (13,533 ft). Some of the cones are active, and Irazú, capped by cloud by day and illuminated by fire by night, is visible from both the Caribbean and the Pacific. Enclosed by the cordilleras is an elevated tableland—really a structural depression—the most important part of which is known as the Central Valley. The Meseta Central, averaging 4000 ft in elevation, is the heart and hub of the republic. This upland country has a mild temperate climate inviting to the European and provides a successful example of white settlement within the tropics. The coastal margins, on the other hand, have tropical conditions with much rain. The windward Caribbean coastlands and mountain slopes are very moist with rain falling almost every day and giving rise to tropical forest. The Pacific side is drier and deciduous forest with patches of savanna is typical.

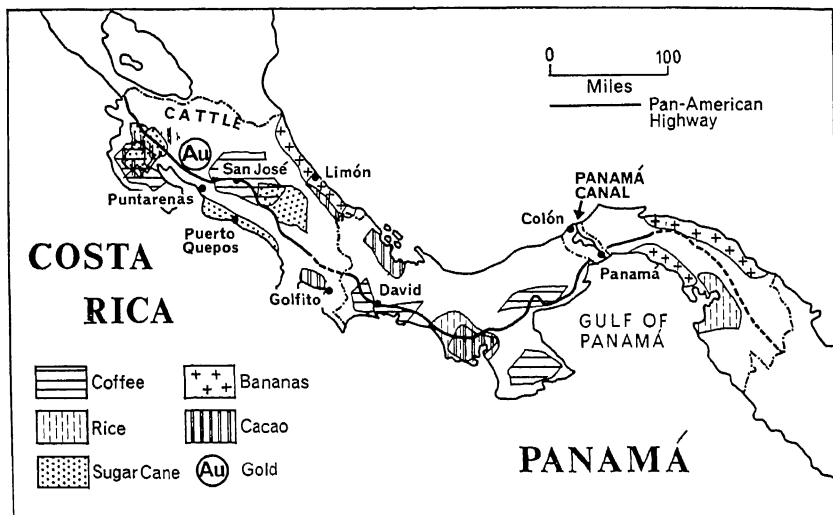


FIG. 48.—Costa Rica and Panamá: general features.

Just over half the working population are engaged in agriculture, which is concentrated mainly in the Meseta Central. Agricultural production in Costa Rica is much the same as in the other Central American Republics—coffee and bananas for export, maize, beans, and potatoes for home consumption. Land ownership, however, is different. In most of the republics the land, or at least the better land, is held in large estates, but in

Costa Rica the Central Valley is mainly cultivated by small-holders. Here the rich, black volcanic soils are ideally suited to the coffee bush, and near San José, the capital, there is an important coffee-producing area. Costa Rican coffee, mild in type, is of extremely high quality and enjoys the reputation of being the finest in the world. Needless to say, it fetches a high price in the world market. About 140,000 acres are devoted to coffee, which yields some 30,000 metric tons a year.

Bananas form the second export crop, but they are grown on the coastal lowlands under the plantation system. The original plantations, set up by the United Fruit Company, were along the Caribbean coast in the neighbourhood of Puerto Limón, but these had to be abandoned as disease wasted the trees. Large new plantations were established on the Pacific coastlands, which were free of Panamá disease, and the United Fruit Company has constructed two ports at Quepos and Golfito to handle the banana trade. At the present time about 8 million stems are exported annually, mostly to the United States and Canada. A point of interest is that Costa Rica was the first of the Central American Republics to grow bananas and coffee, the latter being introduced as early as 1797, the former in 1878. Other crops are cacao and abacá (manila hemp), both cultivated on the old banana plantations, the African oil-palm, a recent introduction, tobacco, sugar-cane, maize, rice, beans, and vegetables.

On the plains of Guanacaste Province on the Pacific side there is a flourishing cattle-raising industry. The pattern of land holding here differs from that in the Meseta Central: great cattle estates, in the hands of prosperous *estancieros*, replace small-holdings typical of the highlands. While the lowlands are concerned with beef cattle, there is a dairying industry in the cool, pleasant highlands in the neighbourhood of Turrialba. The 980,000 cattle are sufficient to meet the country's present demands for meat and milk.

The total area of cropland is only 12.5% of the total area; most of the remainder of the country is forested. Although some hardwoods, balsa-wood, and dyewoods are extracted and there is a small export of "cativo," a soft timber used in the manufacture of plywood, the forest resources are little touched.

Costa Rica ranks second only to El Salvador as the most industrialised of the six republics. Even so, there is little developed industry and the factories (7963 in 1960) are small. Manufacture is based upon plentiful water power, which is being increasingly developed. Among Costa Rica's many miscellaneous industries are cotton textiles (using a small amount of home-grown cotton), light engineering, soap and vegetable oil production, rope-making, saw-milling and furniture making, sugar-refining and distilling, and the canning of fruit, vegetables, and fish. Most iron and steel goods, chemicals and fertilisers, petroleum products, and textiles have to be imported.

Over half the republic's total population of about 1.5 million live in the Central Valley, and here in this rich, rolling upland country are numerous

small towns, many of them linked by the Inter-American Highway, which runs through the republic from the north-west to the south-east, though it stops short some 75 miles north of the Panamá frontier. By far the largest town, in fact the only large town, is the capital city San José (325,000), a handsome centre, built on a grid plan, whose architectural style combines fine modern building with the traditional Spanish. San José is linked to both coasts by a railway which runs from Puerto Limón on the Caribbean across country via the capital to Puntarenas on the Pacific. Settlement, long confined mainly to the Meseta Central, is "now spreading out into the area around the Gulf of Nicoya, along the whole Pacific coast, into the eastern parts of the country, and down the valley of the Reventazón."*

While each of the Central American Republics is different, Costa Rica may be said to stand apart from the others. It does so principally on two counts: first, its essentially white population with only small non-white minority groups and, second, its progressive and advanced character, which manifests itself in the political, social, and economic life and organisation of the country.

PANAMÁ

The Republic of Panamá occupies the S-shaped Isthmus of Panamá and, excluding the 648 square miles of the Canal Zone which are under United States jurisdiction, has an area of 28,753 square miles. Much of the country lies above 3000 ft, with the Cordillera de Talamanca in the west and the San Blas Range in the east. Within these highlands are small, fertile, intermontane basins; bordering the ranges are shelving lowlands. A climate that is generally hot and very wet in the lowlands, especially the Caribbean coast, where the average temperature is 82° F (28° C) and the rainfall anything from 80 to 150 in., and cooler and less moist at higher altitudes, but which almost everywhere gives rise to forest growth, summarises the salient points of Panamá's physical geography.

Until 1903 Panamá was one of the nine departments of the neighbouring state of Colombia. The Panamanians, disgruntled over the attitude of the Colombian Government towards the construction of a canal across the isthmus, declared their independence. War followed, but the Panamanians received the United States' backing and blessing and achieved independence, although Colombia refused to recognise the territorial sovereignty of Panamá until 1921. Very shortly after Panamá became independent it agreed to give the United States facilities for the construction of a canal. If the Canal was the *raison d'être* of the Republic it is now its chief prop.

Professor Platt summarises the role, function, and character of Panamá thus: "it is known as a crossing place rather than as a populous and productive nation. This idea is justifiable, even though the Canal Zone is less than 2 per cent of the national area and is not controlled by the nation.

* *The South American Handbook*. 1967. P. 633.

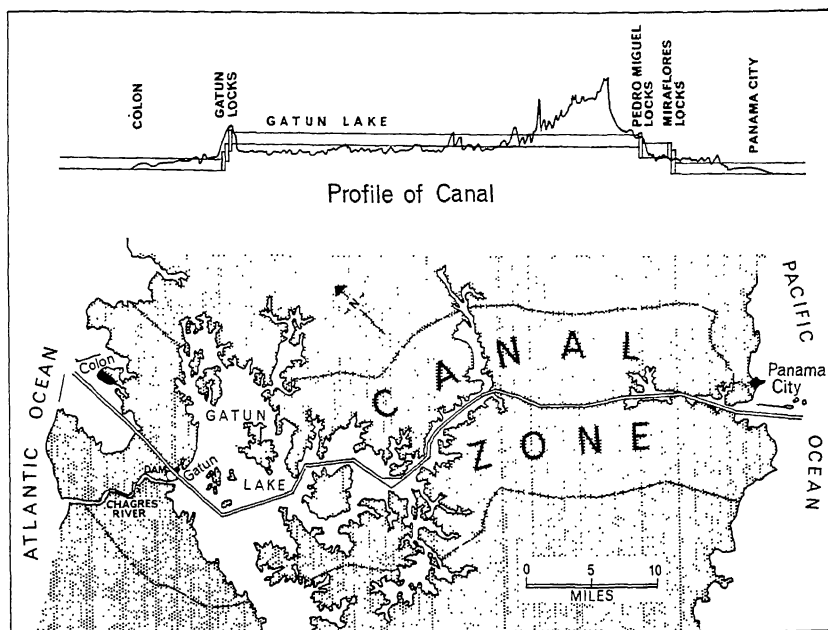


FIG. 49.—Map and cross-section of Panamá Canal. The map and section, which at first sight appear to be the wrong way round, are, in fact, not so. Remember the canal runs obliquely across the Isthmus of Panamá from north-west to south-east.

The crossing place is the heart of the country and gives character to it as the central plateau gives character to Costa Rica. It is not surprising that Panamá is the most cosmopolitan country of Central America, that its imports are much greater than its exports, that population and wealth are concentrated in a relatively unproductive district, and that it has the largest port city in Central America. The capital of Panamá and the other important city, Colón, are phenomena of the crossing place, so close to the Canal that they form enclaves in the Canal Zone excluded by explicit arrangement.* So magnetic is the pass route that almost half of the republic's million people live in urban and rural areas adjacent to the Canal Zone, and in Panamá City and Colón about a third of the employed population is dependent upon work in the Zone.

Economically, Panamá depends upon the Canal Zone. The products of field (bananas, cacao, and sugar), forest (mahogany), and sea (shrimps) supply roughly \$20 million worth of exports, but imports are approximately five times this amount. This trade gap is closed by substantial invisible exports, "from selling the services of its citizens to the Canal Zone; from the money spent in the Republic by United States employees and military personnel in the Zone, merchant seamen and tourists; and from annual sums realized during registration and the miscellaneous fees

* *Latin America*. P. 78.

collected by consular services from the country's enormous registered merchant fleet."* Panamá's financial and economic security is, in fact, tied too closely to the Canal, and indeed during recent years the Government has given a greater measure of encouragement to agriculture. There are many fertile, but empty, areas which could be farmed; there are extensive forests which could be exploited; there is mineral wealth which might be developed; and there are seas which might be more assiduously fished. Developments in these directions would do much to give Panamá a better balanced—and perhaps a less hazardous—economy.

The Panamá Canal. The most important single feature in the geography not only of Panamá but of the whole of Central America is the Panamá

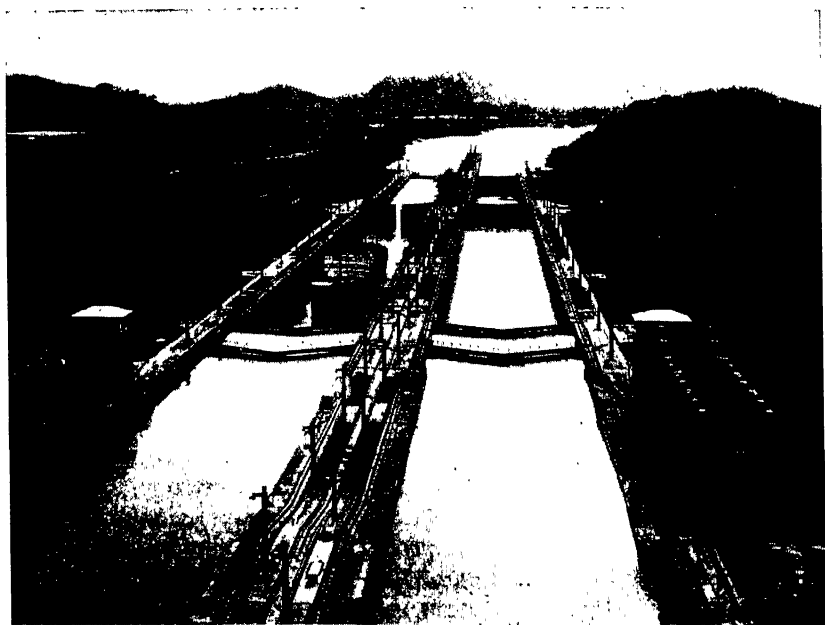


FIG. 50.—Miraflores Locks. The locks at Miraflores near the Pacific end of the Panamá Canal. Unlike Suez, the Panamá Canal has to cut through hilly country, and from Balboa, the Pacific terminus, two sets of locks, the Miraflores and Pedro Miguel, have to be negotiated to reach Gatun Lake. On the Atlantic side the descent is made through the Gatun locks.

Canal, first opened in 1914. As already noted, the United States was leased in perpetuity a ribbon of territory across the isthmus so that it could complete the project which Ferdinand de Lesseps, the builder of the Suez Canal, had started in 1882 but which he had been unable to complete as a result of the bankruptcy of the financing company and the terrible toll exacted upon the labour force by tropical diseases.

The Panamá Canal, one of the two major man-made inter-ocean pas-

* *The South American Handbook*. 1967. P. 742.

sage ways in the world, is cut where a fortuitous gap exists between the Cordillera de Talamanca and the San Blas Range at the narrowest part of the isthmus and where the highest point is no more than 285 ft above sea-level. The Canal is one of the world's greatest engineering feats. It is 51 miles in length (from deep water to deep water) with a 40-ft depth. From Cristóbal vessels ascend in three steps or locks to Gatún Lake and thence cross the higher land by means of the 8-mile Gaillard or Culebra Cut, finally descending to Balboa, the Pacific terminal, by means of the Pedro Miguel and Miraflores locks. The passage normally takes 8-9 hours.

The opening of the Panamá Canal completely re-orientated the trade routes of the Western Hemisphere and focused many new shipping lanes into the Caribbean. It has greatly improved communications between the eastern and western coasts of the Americas and between Europe and Western America and New Zealand. For example, the journey between Liverpool and San Francisco is shortened by 5000 miles (approximately two weeks' steaming-time) compared with that round Cape Horn. The Canal, moreover, has made a significant contribution to the development of the countries of western South America, which were previously remote and inaccessible.

The Panamá Canal does not compare with the Suez Canal from the point of view of traffic or freight: in 1962, 11,149 ships—a record number—passed through the Panamá Canal as compared with over 15,000 using Suez, while cargo amounted to some 62 million tons in comparison with 115 million for Suez. The west-to-east traffic is more than twice as great as that flowing westwards.

BRITISH HONDURAS

The colonial territory of British Honduras, or "Belize" as it is called in Central America, is a strip of land some 170 miles long and nearly 60 miles wide on the Caribbean coast. On the north and north-west it is bounded by Mexico; on the south and west by Guatemala. With an area of 8867 square miles, it is approximately the size of Wales. On 1st of January 1964, the colony advanced to a fuller measure of internal self-government, with a ministerial system and cabinet responsibility.

British associations with the territory would appear to go back to 1638. In that year a few shipwrecked adventurers, under the leadership of a Scottish buccaneer, Wallace or Willis by name, established a settlement. Some people believe that Belize is a corruption of the Scotsman's name. Others think the name derives from the French *balise* meaning a beacon, for there is supposed to have been a light marking the entrance to the river on which the settlement lay. Yet another view is that the name comes from "Bullys River," i.e. the river of bullet or bullywood trees, a name found on an old chart. All three are plausible explanations.

British Honduras, geographically and historically, has always been, and remains still, an isolated portion of the British Commonwealth. Geographically, it is an isolated colonial enclave in Spanish-speaking Central

America. The Central American republics—all ex-colonial territories in origin—view with a certain resentment this relic of the old colonial system. They aver that British Honduras is an integral part of Central America and, indeed, Guatemala has long laid claims to the territory. Historically, too, British Honduras has been an isolated unit, for its story is completely divorced from that of British settlement in North America, while its connections with the islands of the West Indies have been extremely tenuous.

The Physical Background. Along the coast the land is low-lying and much of the plain is covered with mangrove swamp. Behind the marshy littoral the land gradually rises up to give a belt of savanna and scrub with patches of forest. While the northern portion of the colony is generally flat, the southern part is hilly and mountainous. The Maya Mountains, which rise to 3700 ft in the Cockscomb Range, run roughly parallel with the coast. Farther inland a wide tract of open grassland country with hill ridges covered with pine trees, known as "the pine-ridge country," extends westwards into Guatemala. Numerous rivers rise in the highlands and flow in a generally eastwards direction. Since most of them are navigable, they provide natural water-routes into the interior which can accommodate shallow-draught craft. The inner coastal waters are sheltered by a reef whose small islands are known as *cays*. Between this reef and the mainland is a stretch of calm, shallow water which in former times provided a splendid and safe anchorage for pirate ships.

In earlier days the colony had a bad reputation as being unhealthy. This, however, was completely undeserved, and Europeans can live here quite comfortably and maintain their health if they lead normal lives and take adequate precautions. Conditions, it is true, are sub-tropical, and during the rainy season (June to January) the heat and humidity tend to make the weather oppressive, but during the dry season (approximately February to the end of May) the days are bright, sunny, and pleasant and the heat is tempered by northern winds. Rainfall varies considerably from year to year, but ranges from an average of 51 in. per annum in the north to 175 in. in the extreme south. British Honduras lies in the hurricane belt and from time to time the colony is struck by these devastating tropical storms. On 27th of September 1955, for instance, a hurricane swept across the northern part of the colony and completely destroyed the town of Corozal and damaged many villages in the neighbourhood.

Apart from the cays and the coastal area and the open spaces of the pine-ridge country, British Honduras is covered with almost unbroken tropical forest. About 90% of the total area is under dense forest containing valuable hardwoods.

Population. Apart from the pirates who used the hide-outs along the coast, the first settlers were British adventurers attracted by the wealth of valuable timber. During the seventeenth century small settlements were established along the river banks for the purpose of cutting logwood. Soon the first settlers were reinforced by others from Jamaica, who shared

in the logwood trade. The woodcutters, or "baymen" as they came to be called, used St. George's Cay, one of the small islands of the reef, as their base. The mainland territory worked by the logwood cutters became known as the "Settlement in the Bay of Honduras." For close on two centuries this was the name by which the territory was known. In 1862 it was declared a Colony but became subordinate to Jamaica. In 1870 British Honduras became a Crown Colony.

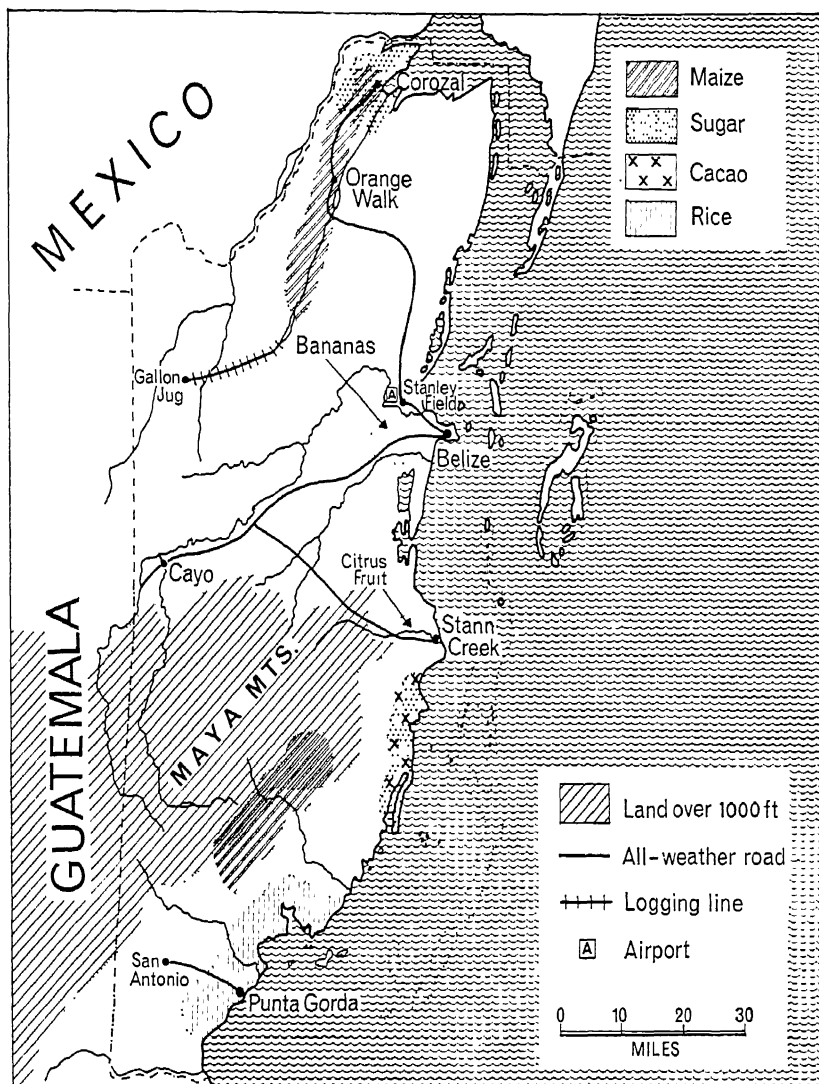


FIG. 51.—British Honduras: general features.

The total population is about 90,000. The people are a heterogeneous mixture including Europeans, Negroes, American Indians, Caribs, and East Indians, together with a proportion—approximately 25%—of mixed racial origin, mainly mulatto. British Honduras differs from the republics of Central America in having an appreciable Negro population: over a quarter are of African descent. This fact, plus proposals in the past to promote Negro immigration into British Honduras as a means of easing the problem of pressure of population in the West Indies, has disturbed the predominantly Indian Republics.

The American Indians, who number some 10,000, are the descendants of the ancient Mayas. In truth there are many ruins of Mayan cities in British Honduras. The Caribs, though indigenous Indians, form a very distinct group. They show some admixture of Negro blood and are physically very robust, making them excellent woodcutters. They are also expert sailors and navigators and adept fishermen.

Although the various racial groups tend to live in certain localities, there is virtually no colour problem in British Honduras. Belize, until its recent destruction by a hurricane, was the main port and capital. It was the sole town of any size (38,000), mustering about one-third of the colony's total population. The refugees settled themselves outside the ruined city at Hattieville, which will probably become a permanent settlement. The site for a new capital is being planned. It will lie about 50 miles inland at the junction of the Western Highway with the Hummingbird Highway.

Forest Resources. The richness of British Honduras' forest resources has formed the main basis of the economy, and the chief source of revenue is provided by the export of forest products. Mahogany of very fine quality grows in the colony, and its reputation has sustained the mahogany export trade for over a hundred years. The difficulties of working in the forest, besides the fact that the mahogany tree does not occur in stands but is widely scattered, has put a limit to the range of economic extraction. Widespread and wasteful cutting in the more easily accessible areas, *i.e.* near the rivers, has led to serious depletion of the resources. Only in recent times has a vigorous policy of afforestation and conservation been introduced. Now there is a strict supervision of the colony's timber wealth to ensure that stocks are not wantonly cut and forest regeneration is safeguarded.

The timber companies employ expert woodmen, known as "timber-cruisers," whose job is to search the forest and select and mark trees suitable for felling. When a tree has been cut the trunk is trimmed and then cut into manageable logs which are dragged by tractors to the *barquedier*, a cleared space beside a river or creek. Formerly, the logs were hauled by teams of yoked oxen working by torch-light during the cool of the night. But, except in the smaller camps, the use of oxen has been superseded by the tractor. The logging must be completed before the beginning of the rainy season, *i.e.* May-June; then the swollen streams can float the logs

downstream. At the river mouths "boom-men" assemble the logs into rafts, a tricky and difficult job requiring great skill. In 1956 732,000 cu. ft. of mahogany were exported.

The high rain-forest, which covers about 70% of British Honduras, contains many other valuable timbers, such as rosewood, ironwood, chechem, and Santa Maria, which is heavier and stronger than mahogany, but these are of lesser importance, the total export amounting to approximately 50,000 cu. ft. annually.

The pine forests are being increasingly exploited, and during recent years over 1 million cu. ft. of pitch pine have been exported. In spite of the greater cubic capacity exported, the pine is worth less than half the value of the mahogany.

Another forest product of considerable value is chicle, the raw material from which commercial chewing-gum is made. A potential resource is the Cohune nut palm (*Orbignya Cohune*). The fruits grow in large bunches and furnish a valuable oil and vegetable ivory.

Agriculture and Settlement. Although the economy of the colony is based mainly upon the forest resources, considerable agricultural expansion has occurred during recent years. Even so, only about 2% of the total area is under any kind of cultivation. There is no shortage of fertile soils, and the colony could supply all her requirements, and more, quite easily if the country was opened up, settled, and made accessible. E. W. Evans epitomised the character of the colony when he wrote: "It still has something of the rawness of a country of scattered groups of squatters."*

Nearly half the total population is concentrated along the coast in and around Belize and the other small ports of Corozal, Stann Creek, and Punta Gorda. In the interior only two places, Orange Walk and El Cayo, are settlements of any significance, and both are on rivers. In the north, around Corozal, sugar-cane is cultivated, and Corozal has a refinery. In the Stann Creek Valley, where the soils seem particularly well suited to the cultivation of citrus fruits, extensive grapefruit, orange, and lime groves line the valley on both sides of the road, which now follows the track of the old—now gone—railway. The citrus fruit industry has followed in the wake of the banana industry, which was ruined by Panamá disease. Fresh fruit packing and canning factories have been established.

Apart from some half-dozen or so small townships, the people live in village settlements on riverside or hillside clearings. They practise shifting agriculture, growing such crops as maize, plantains, mangoes, and beans.

Belize. Before its destruction the capital was built on a flat, low-lying spit of sand at the mouth of the Belize River. It was, in fact, only 1 ft above sea-level, a condition which presented formidable problems of drainage, water supply, and sewage-disposal. Belize was dependent upon the rainfall for its supplies of fresh water, and every house was legally

* *Britannia Overseas*. Nelson. 1946. P. 20.

compelled to keep a water tank. It had a number of small factories producing furniture, sailing boats, footwear, soap, and cigarettes, but the most important industry was saw-milling. The bulk of the colony's trade, whether import or export, passed through Belize. The port was approached through a break in the off-shore reef, but the shallowness of the water compelled vessels of 20-ft draught and over to anchor a mile off shore. Goods were trans-shipped by barge. The establishment of an international airport at Stanley Field, about 10 miles north-west of Belize, has helped to dispel some of the former isolation of the colony.

Chapter VI

THE WEST INDIES

THE islands lying in the great ocean embayment between North and South America are known as the West Indies. They extend in a great broken arc from the Peninsula of Yucatán almost to the mouth of the Orinoco and form a gigantic breakwater separating the open ocean waters of the Atlantic from the semi-continental seas of the Gulf of Mexico and the Caribbean. The western wing of the island arc is commonly called the Greater Antilles (embracing Cuba, Jamaica, Hispaniola, and Puerto Rico), the eastern wing the Lesser Antilles (comprising the Leeward and Windward Islands). Geographically, however, it is useful to recognise four main island groups: (i) the Greater Antilles; (ii) the Lesser Antilles; (iii) Trinidad and Tobago; and (iv) the Bahamas. Political conditions cut right across any natural grouping and present a problem in treatment. Here we shall discuss the major islands of the Greater Antilles as separate units and deal with the remainder according to their British, French, and Dutch associations.

Two fundamental facts concerning the region as a whole must be emphasised: first, the strong European and American influence, which has long affected the islands, and, second, the great variety within the overall unity which characterises the area.

European influence in the West Indies began with their discovery by Columbus in 1492. The Spaniards quickly occupied the islands, and they remained a Spanish preserve throughout the sixteenth century. Thereafter, British, French, Dutch, and Danish interlopers acquired control over several islands, a control which for the most part they continue to have until the present day. In 1898 the United States, as a result of war with Spain, established its sovereignty over the island of Puerto Rico, and from this time dates active American participation in West Indian affairs. Recently there has been a revolt against American control and influence in the West Indies; Cuba, in particular, has proclaimed itself violently anti-American. In the case of the British West Indies it was hoped the formation of the British West Indian Federation would introduce an element of greater independence in the area and a new political factor to be reckoned with.

Although the region possesses a remarkable degree of geographical unity, manifest in a common insular character, general location, tropical trade wind climate, and economic activity—"a common geographical warp and woof" as J. Russell Smith called it*—there are, also, considerable

* SMITH and PHILIPS. *North America*. New York: Harcourt Brace & Co.

differences and contrasts in the structure, relief, appearance, peoples, culture, and natural resources of the islands. The West Indies present a veritable mosaic of physical, human, and political and economic conditions; in truth, it is this diversity which provided the greatest obstacle to the successful integration of the British Caribbean Federation. In the following accounts of Cuba, Hispaniola, and Puerto Rico we shall be conscious of the broad similarities which occur, but it will be apparent that there are numerous differences in detail. In the case of the Lesser Antilles the differences are, perhaps, even more striking.

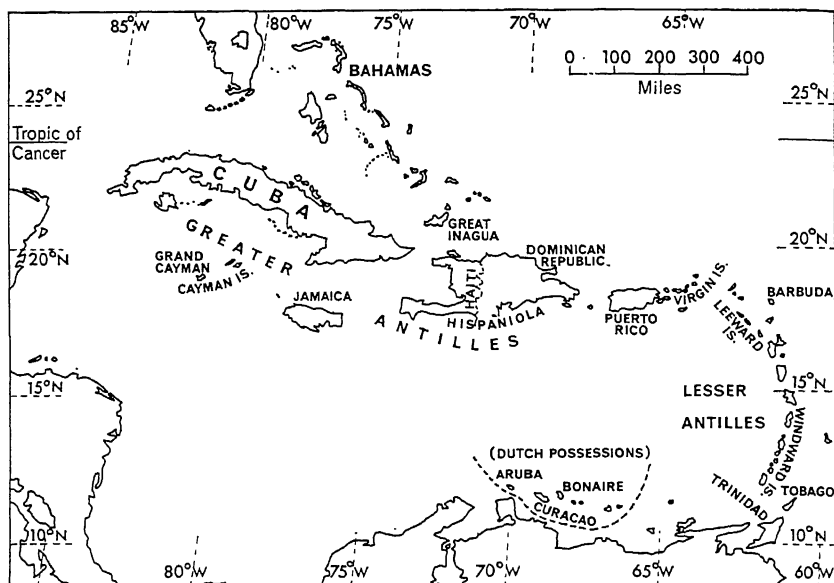


FIG. 52.—The West Indies.

Before proceeding to the regional descriptions it may be useful to summarise the salient features of the socio-economic pattern of the West Indies; we shall then be able to see how and to what extent these features occur in and characterise, or differentiate, the various islands. Briefly, five patterns are distinguishable: (1) the urban dwellers, who live largely by trade and commerce (often carried on by Chinese, East Indians, and Syrians) or work in factories and who are generally the more active and better-educated people; (2) those employed as dock labourers, in mining, and by the oil-refining companies, a small group, sometimes possessing a certain technical knowledge and living on the wages they earn; (3) those, numerically many, living a poverty-stricken miserable existence labouring on the large estates (usually producing sugar) of a small number of rich hacienda owners who, in the past, have often formed the ruling oligarchy; (4) those, again large in number, who work on the great commercial plantations run by foreign corporations or in some cases the State and who

frequently live in village communities with welfare facilities provided by the employer; and (5) the backward, poor, subsistence farmer who ekes out only the barest living growing a few crops (often under a shifting system of agriculture) and raising a few chickens and pigs.

CUBA

Cuba is much the largest island in the West Indies, having, indeed, half the total area of the insular region: 44,178 as against 89,265 square miles. Not only is Cuba large, but its soils are fertile and it has a much larger proportionate area of utilisable land than its Greater Antillean neighbours. Apart from the Sierra Maestra in the southern part of Cuba, which rises to heights in excess of 5000 ft, the island lies mainly below 500 ft and is a rolling plain. Low, gently rounded hills and shallow valleys form the characteristic topographic pattern. This surface relief has made Cuba suitable to mechanised agriculture. Although two-thirds of the island are composed of limestone, the rocks have weathered to give a rich soil, red to yellow in colour and varying from clay to light loams in type.

The narrow, elongated form of Cuba and the absence of a high central mountain backbone such as is found in the other three large islands have resulted in two noteworthy climatic effects. The prevailing North-east Trade Winds carry maritime influences inland—no part of the island is far from the coast—and summer heat is thereby tempered. On the whole, the climate is very equable and generally healthful. The lack of any strong relief barrier, except in the south-east, has reduced the rainfall; precipitation is usually between 40 and 70 in., with the coastal areas averaging 50 in. annually and the interior areas 60 in. Two main seasons are recognised: the rainy summer season, extending from May to October, when heavy rainstorms occur accounting for about three-quarters of the annual total precipitation, and the cool "dry" season from November to April, which is a very pleasant time of the year.

HISTORICAL BACKGROUND

Cuba was a Spanish possession from the sixteenth to the nineteenth century. As the Spanish hold in the Americas weakened, revolts began to take place, and when the United States defeated Spain in war in 1898 the Americans assisted Cuba in its bid for independence. Between 1898 and 1902 the island was occupied by United States troops. Military rule ensued which brought numerous and far-reaching reforms. A republican constitution was adopted by the Cubans in 1901. Although the Americans withdrew, Cuba remained virtually an American protectorate until 1934 when the United States abrogated its treaty rights. Between 1933 and 1958 Cuba was under a military dictatorship.

Cuba's history helps to explain much of the country's racial, social, and economic characteristics. Cuba was used mainly as a base for Spanish operations against Mexico and Central America. Although some Negroes

were brought in to work on the plantations, the Negro element does not loom so large as in many of the other islands. Nearly three-quarters of the total population of 7,833,000 are classed as white. While the whites are perhaps mainly descendants of Spanish colonial settlers and immigrants, they include a considerable mestizo element. Approximately 25% are Negroes and mulattoes, who are congregated along the coast and in Oriente province. There is a sprinkling of Asiatics, mainly Chinese, who number about 1% of the population. In spite of its large population, Cuba is fairly sparsely settled. Here is an important contrast with the other major West Indian islands. There is, too, a remarkably high urban population; fully half are town-dwellers, and Havana alone contains 18% of the island's people.

Spanish is the language of most Cubans and the Roman Catholic faith predominates. Both these cultural features are a legacy of Spanish rule. Place-names, architecture, and many customs are indicative of the Spanish heritage.

Physical proximity to the United States, political association, and the original commercial treaty of 1903 have all fostered economic ties. Until very recently (1960) Cuba has been very closely linked economically with the United States, which purchased 75% of the island's exports and supplied some 80% of the imports. The new regime, under Fidel Castro, has adopted a violently anti-American attitude. United States property has been seized and the Cubans are trying to oust the Americans from the naval base at Guantanamo Bay, which they have occupied since 1902.

THE CUBAN ECONOMY

Of the total area of 28 million acres, about $5\frac{3}{4}$ million acres or approximately 18% are under cultivation. Another 14% is classed as cultivable land. About 35% is pasture land, about 25% forest and woodland, and the rest waste.

Cuba possesses extensive mineral resources, with especially rich deposits in Oriente Province. Large deposits of iron ore occur, the bulk of these reserves being held by the United States. Cuba is an important producer of nickel (fifth largest world producer), manganese, chromium, and copper. Smaller deposits of certain minerals, including gold, silver, salt, asphalt, and petroleum, are also found. Considerable forest resources exist from which mahogany and white cedar (used in the making of cigar boxes) are extracted. Fishing is of greater consequence in Cuba than in most West Indian islands, and the fisheries yield, in addition to edible fish, sponges, turtle shell, and mother-of-pearl. The sponge fishing industry, centred on Batabano, has fallen on hard times.

Primarily, however, Cuba is an agricultural country and agricultural products are the economic mainstay of the island. Cuban prosperity is, moreover, based on two crops, sugar and tobacco, and of the two sugar is dominant. It is scarcely too much to say that Cuba is a single-crop country. 67% of the cultivated area—between 3 and 4 million acres—are

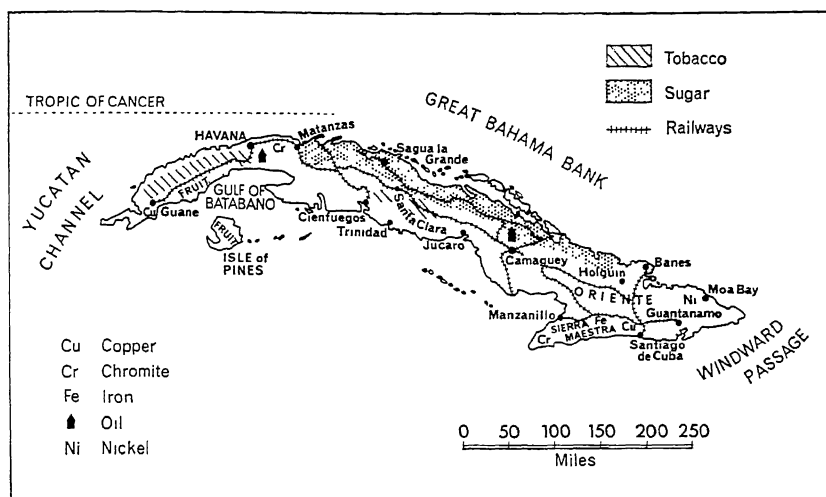


FIG. 53.—Cuba: general features.

devoted to cane-sugar production. Currently, the sugar output is running at 6 million tons annually. Cuban production is about 30% of the total world output and Cuba ranks second (after India) in the world as a sugar producer. Until 1960 the bulk of the United States' requirements of sugar were supplied by Cuba, which received preferential treatment. The United States took a half to three-quarters of the Cuban sugar crop; the rest went mainly to Europe.

The second staple is tobacco. In the form of Havana cigars it is renowned. It is grown principally in the western part of the island. Cigars and leaf tobacco constitute about 10% of Cuban exports. Coffee, maize, rice, henequen, bananas, and pineapples are also grown and winter vegetables are a commercial export crop of much importance. Honey is collected in large quantities, the harvest running to about 12 million lb a year, most of which is exported.

Stock-raising thrives on the savanna grasslands of central and eastern Cuba. Extensive areas of succulent parana grass provide good ranging grounds for cattle and there are over 4 million head of dairy and beef cattle. There are also some 600,000 pigs and about 450,000 horses.

The recent political change has brought many difficulties to Cuba, and the economic situation has deteriorated. At present Cuba is relying upon help from the Soviet Union. If this assistance should be withheld for any reason the whole Cuban economy might well collapse.

SUGAR PRODUCTION

The over-riding importance of sugar in the Cuban economy and the interest which attaches to its production warrants some further consideration of the industry.

Climatic conditions in Cuba are almost ideal for cane-sugar cultivation.

During the growing season the cane requires fairly abundant rainfall, from about 45 to 60 in., but this wet summer period must be followed by a dry season to assist the concentration of sucrose. If the rainfall is too heavy or the rainy season too prolonged the cane grows too luxuriantly, the juice becomes watery and the sugar content low. Hence, seasonal alternation is needed for successful cultivation. The windward sides of the West Indian islands lack this effective seasonal alternation, thus sugar-cane cultivation is more commonly undertaken on the leeward sheltered sides of the islands, where a fairly pronounced dry season is usual after the summer rains. The dry season is also important for the actual harvesting.

The land has a chance to dry out and the cutting and transporting of the cane—usually by two-wheeled ox-cart—is facilitated. The greatest hazard the cultivator has to face is the occurrence of hurricanes; these break and lay flat the canes and spoil the yield by setting up fermentation of the juices. In Cuba the canes are grown on limestone soils in areas of well-drained level or rolling topography well suited to machine agriculture.

Pieces of cane stalk with a "joint" are planted in furrows and covered with soil. These cuttings take root, and from them grow the stalks. After eighteen months the canes are ready for cutting. Fresh canes can be cut from the same root for five or six years, but with each succeeding year the yield is reduced by about 30%, thus by the fifth or sixth season the yield may be down to 5 tons per acre or even less. The ratoon period, *i.e.* the period between the planting of the cane and its uprooting when exhausted, is about five or six years. Sugar-cane requires a rich soil, since it is rather exacting in its demands, and unless the soils are fertilised they quickly become exhausted. Cane also makes heavy demands upon labour. The planting, hoeing, and harvesting are usually done by hand labour (where labour supply is abundant and cheap). This is the usual practice in the West Indian islands, but in other parts of the world where labour costs are high, cultivation is mechanised.

The cane stalks, 12 ft or so tall, are cut by hand or, on some estates, by machine and then stacked on bullock carts or on trailers drawn by tractors and taken to the mill. At the mill the cane is carried by conveyor belt to the extractor, where it is crushed between heavy rollers which squeeze out the juice. The juice, thickened by the addition of lime, is then crystallised to produce raw sugar, which is golden brown in colour. The sugar is usually shipped in this semi-purified state, being further purified in the country where it is consumed. A percentage of the juice cannot be crystallised into sugar: this thick residual syrup forms molasses from which treacle and rum (an important by-product) are made. Molasses is also used as an animal feedstuff.

THE SUGAR CENTRALS*

Sugar-cane production is essentially a large-scale industry with mass production as its keynote. It is organised around the centrals or corpora-

* This section is based on conditions prior to 1959.

tion-owned mills. Although the great companies have their own plantations, about three-quarters of the cane is produced by small-holders or colonos upon colonias (cane farms). The small farmers are usually under contract to the sugar corporations and send their cane to the nearest central. For example, the Central San Ramon* serves the Mariel district of Western Cuba, an area of 65 square miles, which has about 38% of its total acreage under cane. The central, which belongs to a Cuban company, receives cane from only 25 square miles. 40% of the cane land is under the direct control of the company; the rest is indirectly controlled by the company. 225 colonos, the majority of them working small farm units of 20 acres or less, grow cane for the central. The San Ramon Central now processes cane which hitherto was treated in some seventeen small mills.

The large plantation, the colonias, and the central are all integrated into a single producing unit. An aerial photograph of such a unit would show the mill, where the cane is processed, a village or township, where the workers live, and the surrounding fields, where the cane is grown. Large units are virtually self-contained and self-supporting. The mills have their own railway yards, repairing sheds, ice plants, laundries, lime preparation plants, etc. The townships have churches, schools, hospitals, stores, amusement centres, playing fields, etc.—all provided by the central to meet the various needs of the workers.

Large-scale commercial production obviously demands heavy capital investment to equip the rolling mills and factories, to build estate railroads, and to employ a labour force of up to 10,000. Efficient and cheap production can be achieved only by mass production, hence the independent producer is gradually being eliminated in favour of the great corporations.

TRANSPORTATION AND URBAN CENTRES

Largely as a result of its fertility and productivity, Cuba has a greater population and a greater foreign trade than any of the Central American republics or the other West Indian islands. Other contributing factors have played a part, however, notably accessibility and foreign investment. Because Cuba is near to the United States and because of the political associations, already referred to, the island has received substantial investment from its great continental neighbour. In the sugar industry alone the Americans sank well over \$1000 million. Economic developments have influenced communications and Cuba has the best network of railways in the West Indies.

An outstanding feature of the social geography of Cuba is the extent to which the country is urbanised. Havana (1,120,000) alone contains about 14% of the total population, while Greater Havana has about 1¾ million people. The capital, which is also a seaport and industrial centre, is the commercial metropolis of Cuba. Situated on the northern coast of the

* PLATT, R. S. *Latin America*. New York. 1942. Pp. 125-35.

island, Havana has a fine and beautiful harbour well-protected against storms. The port is the chief exporting centre for Cuban sugar and tobacco. Havana has also developed as a winter resort, and to it each year are attracted thousands of tourists.

Santiago de Cuba (235,000), the second oldest city of Cuba, founded in 1514, is an important commercial centre situated on a magnificent land-locked bay. Santiago has a number of flourishing industries, but its prosperity is closely linked with its rich agricultural hinterland and the mineral deposits that are mined near by. The other chief towns are Holguín (226,000), a trading centre, and Camagüey (204,000), a cattle and sugar centre and distributing point.

There are numerous small ports, chiefly sugar-exporting points, around Cuba's coast. Submergence has produced numerous excellent harbours enabling Cuban exports to "leave by a hundred gateways."

THE ISLAND OF HISPANIOLA

The island of Hispaniola is shared by the two independent republics of Haiti and Santo Domingo, or the Dominican Republic as it is more commonly called. Haiti occupies roughly the western third of the island, the Dominican Republic the remaining eastern two-thirds. In view of its insular character making it a physical entity, one might have expected Hispaniola to become the home of a single nation. But there are quite sharp ethnic and cultural differences between the two parts of the island: the Haitians are almost completely Negro and exhibit a strange combination of African and French cultural features; the Dominicans are predominantly mestizo and their culture traits are basically Spanish. Moreover, there exists a political antipathy arising out of historical associations and the Dominican Republic's fear of threatened illegal Haitian immigration.

HAITI

Haiti was a French colonial possession until 1791. The land up to that time was held by a minority of French landowners. This landed aristocracy lived in luxurious style upon the sweat of thousands of Negro slaves. When the French Revolution occurred the Negroes, stirred by the doctrine of "liberty, equality, fraternity," revolted against their French masters and under their great leader Touissant L'Ouverture achieved freedom, establishing the first Negro republic in the world. Unfortunately liberty was followed by the dreadful massacre of the French. This largely explains why the present-day population, estimated at about 4 millions, is almost 100% black. Throughout the nineteenth century Haitian history is a sorry cavalcade of massacre, civil war, and violence which, as Smith and Phillips say, "may well be cited as a period of reversion to nature." A measure of law, order, and stability did not arrive until 1915, when occupation by the United States took place. As a result of American control

and assistance considerable development took place—roads and railways were built, irrigation schemes developed, water supplies and sanitation introduced into the cities, and schools and hospitals set up—but with the departure of the American armed forces in 1934 and the end of effective American guidance Haiti has seemed to mark time.



FIG. 54.—Hurricane damage. The photograph speaks for itself. Here are the flattened remains of a house. Note, also, the rich vegetation of this West Indian scene.

Haiti—the word means mountainous—is a mountainous land with small areas of plateau and plain. The highest point is 8793 ft in the La Selle Mountains of the south-east. The rugged highlands are the least populated areas; the Plaine du Nord and the large depression known as the Cul du Sac are the most densely settled parts. The climate is tropical, but sea breezes on the coast and elevation inland do much to moderate the heat. Some coastal localities, however, suffer from rather high humidity. Precipitation, brought by the North-east Trade Winds, varies widely in amount, ranging from about 100 in. in the north-east to as little as 20 in. in the south-west. May to October is the wettest part of the year, and during this period hurricanes may occur.

Land utilisation is estimated as follows: 17% arable and orchard; 60% forest and woodland; and 23% unproductive waste land. The small amount of cultivated area reflects the ruggedness of the terrain. But there

are lowland areas, such as the coastal swamplands of the Artibonite Plain, which lie unused. Much good land has been impoverished or destroyed as a result of the improvident methods of farming adopted by the Negroes after the collapse of the French plantation system and deforestation which permitted soil erosion to take place. During recent years various rehabilitation schemes have been started; among them was the recently completed project for the irrigation of 100,000 acres in the valley of the Artibonite River.

Agriculture, which is the dominant occupation, is typically small-scale, inefficient, and frequently primitive. Most of the cultivated land is in the hands of small farmers who own and work their plots. They grow cassava, plantains, and yams, their basic food crops, and keep a few chickens and perhaps a goat. They dwell in simple wood-and-thatch huts with practically no amenities and live in primitive fashion. In fact, the rural Haitian lives a way of life very little different from his West African cousin. Commercial crop production is growing slowly and, in addition to coffee, long the chief crop and the principal export (80% by value of the total trade), sugar-cane, sisal, cotton, bananas, and cacao are produced. Moreover, the potential for commercial production is considerable.

Apart from craft industries, such as the working of sisal and wood, and processing industries, such as sugar-refining, there are few manufactures. There are some sisal factories and cotton mills, and cement, soap, and rum are produced. Most of Haiti's exports go to the United States, which also supplies the bulk of Haitian imports of foodstuffs, textiles, and machinery.

Port au Prince (235,000), the capital, chief port, and largest city, lies at the edge of the Cul du Sac plain. With its curving white beach, palm-fringed roads, and mountainous background, the town has a beautiful setting. The city was laid out by the French in the middle of the eighteenth century, but has suffered from time to time from earthquakes and fires. It has an excellent harbour protected by Gonâve Island. Cap Haïtien on the northern coast serves the Plaine du Nord. It is an older city than Port au Prince and was the original seat of government. It suffered rather seriously from an earthquake in 1842, and has never fully recovered from the disaster. The present-day population is about 25,000. On the south coast the two most important centres are the ports of Aux Cayes or, simply, Cayes, and Jacmel; both have populations around 10,000.

Poverty, illiteracy (estimated at over 90%), and rapid population growth are Haiti's greatest social problems. Many of Haiti's other problems, such as the economic and political, are closely linked with these social problems. More than most countries, Haiti needs the help and generosity of the United States.

THE DOMINICAN REPUBLIC

The independent Dominican Republic shares the island of Hispaniola with Haiti. It occupies the eastern portion of Hispaniola and has an area of 19,322 square miles. The country has had rather an eventful but de-

pressing history, and a brief recapitulation of it will help to shed a little light upon the problems which have faced the republic.

Dominican history may be divided into three main eras: the first, until 1844, when it became an independent republic; the second, from 1844 to 1930, a period of stagnation and difficulty; and, third, from 1930 to the present day, a period of national development and increasing prosperity.

The country was discovered by Columbus in 1492 and immediately became the objective for Spanish adventurers in search of gold. The Spaniards exploited the native Indian inhabitants and later imported African Negroes to work on sugar plantations. During the period of the Conquista the population was largely of a transient character, since the island was the starting-point, as it were, for the occupation of the other islands of the Indies and the mainland. Santo Domingo as the colony came to be called remained under Spanish rule until 1795. From 1795 to 1808 it was ruled by France, from 1808 to 1821 by Spain again, and from 1822 to 1844 by Haitian Negroes. The Haitians were driven out in the latter year and an independent republic proclaimed. During the colonial period the country sank into a state of abandon and there was a constant stream of migration. For almost the first hundred years of the republic's independence conditions were very unsettled and there was virtually no development. Between 1916 and 1924 the country was occupied by the United States.

In 1930 Generalissimo Rafael Leónidas Trujillo Molina, known as "El Benefactor," became dictator. In effect he took over a bankrupt and chaotic country and gave it the outward semblance of a modern state. During the thirty-one years he was in office the Dominican Republic underwent a transformation. Beginning with a ruined economy, Trujillo gradually established a sound currency and a favorable balance of trade, wiped out the country's foreign debt, and built roads, schools, and hospitals. At the same time, however, he suppressed fundamental human rights and ordered the execution of tens of thousands of political opponents. In 1937, when Haitian migratory workers refused to return home, he had 15,000 of them killed. "El Benefactor" acquired a personal fortune estimated variously at between \$800 million and \$1,500 million and he put more than a thousand of his relatives on the government payroll.

After Trujillo was assassinated in 1961 there were a series of interim governments until December 1962, when Juan Bosch gained the presidency in a free election. In September 1963, however, military officers overthrew Bosch and another provisional government was set up. In April 1965 a civil war broke out, and fearing that leftists would turn the Dominican Republic into "another Cuba" the U.S. ambassador requested U.S. military intervention. Eventually more than 20,000 U.S. troops, joined by small contingents from Brazil, Honduras, Nicaragua, and Paraguay, established an international zone in Santo Domingo that separated the opposing Dominican factions. In the June 1966 elections

Joaquín Balaguer, who had previously served as chief executive, defeated Bosch for the presidency.

Much of the country is mountainous and rugged. The Cordillera de Cibao dominates the central part and reaches 10,000 ft. To the north and south of the central highlands lie lowland areas. Northwards, wedged between the Cordillera de Cibao and the Cordillera Septentrional which parallels the northern coast, is a lowland which is nipped in two in the middle, the western portion forming a continuation of the Plaine du Nord of Haiti, the eastern section forming the lowland tract known as the Cibao. South of the central mountains are two detached lowlands, the plains of the Cul de Sac, a deep structural depression, in the west, and the south-eastern plain which fronts the sea in the east. In the extreme south-west the eastern end of the Haitian Sierra de la Selle falls within the Dominican Republic. This summary treatment of the main physical features does not do justice to the actual complexities of the relief. In like manner the climate and the vegetation show complex features. Broadly speaking, the climate is tropical on the lowlands and sub-tropical to temperate at higher elevations. Precipitation varies between approximately 50 and 100 in., and is closely related to the relief. Nearly three-quarters of the country is forested.

The total population of the Dominican Republic is estimated at 3,750,000, giving a density for the whole country of 194 per square mile. The population, however, occurs in two chief concentrations: in the lowland of the Cibao, especially around Santiago, the second city of the republic, and on the south-eastern coastal plain east of Santo Domingo, the capital. The people are predominantly mestizo, of European, African, and Indian blood, and in this respect differ sharply from their neighbours, the Haitians, who are preponderantly black.

Agriculture is the mainstay of the country and the chief source of wealth; the bulk of the people are employed in subsistence or plantation agriculture. The most productive regions are the two lowlands already referred to. In the Cibao cacao, sugar, and tobacco are the chief commercial crops, the cacao being grown in the lowland of the Vega Real and along the shores of the Bay of Samaná, the sugar around the port of Sánchez, and the tobacco along the foot of the Cordillera Septentrional. The western portion of the lowland—west of Santiago—is mainly devoted to the grazing of cattle. The southern plains, more particularly along the coast and in the river valleys, are especially concerned with sugar-cane cultivation, which is grown under irrigation. The interior parts of the lowland are given over largely to grazing.

Sugar production is all important in the republic: it is the crucial crop and dominates the country's economy. The sugar industry goes back to the time of the Conquistadores when cane growing was first introduced. During the colonial period the industry had a brief spell of prosperity and then declined. At the beginning of the present century foreign concerns started large-scale sugar production. Although output has shown a steady

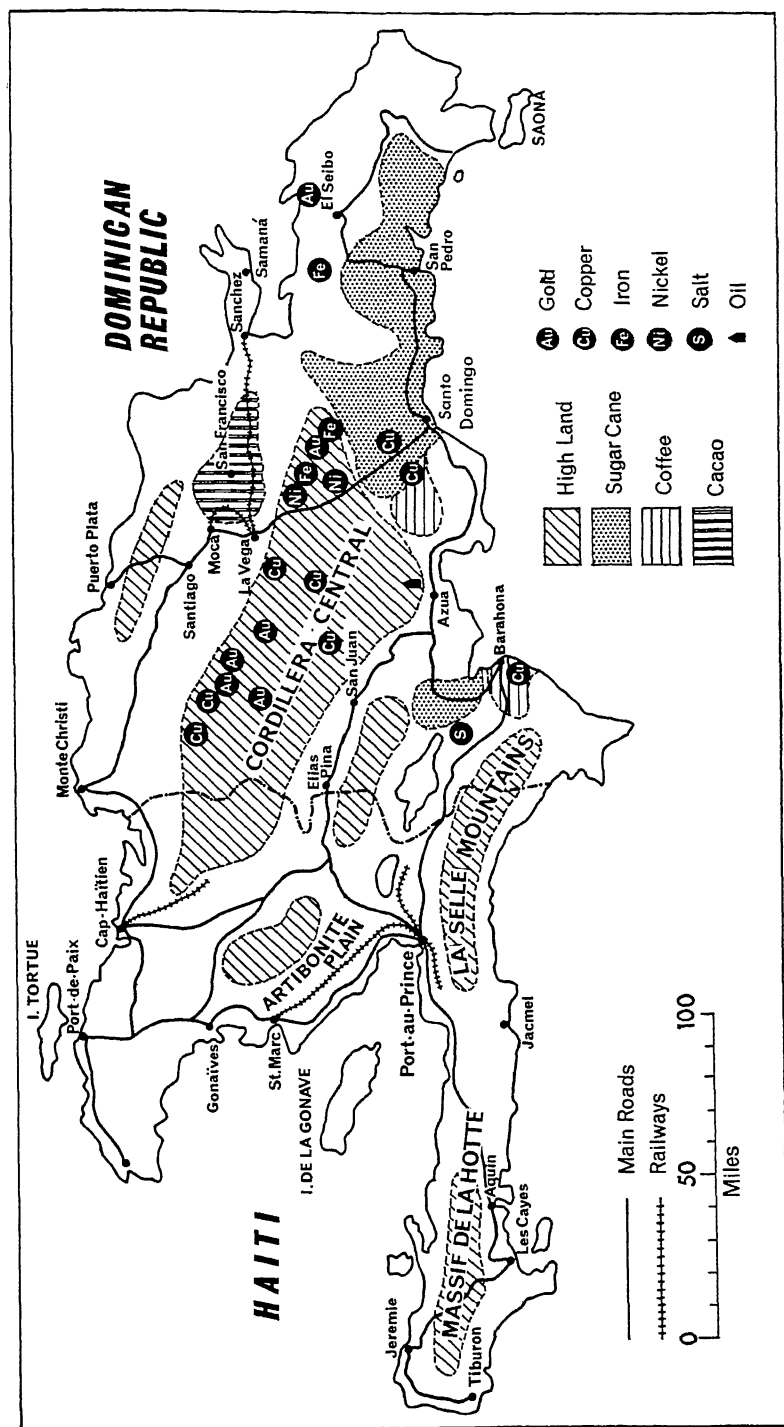


FIG. 55.—Haiti and the Dominican Republic; general features.

increase, as the following figures show, it was not until 1950 that production began to go up by leaps and bounds.

TABLE X

Dominican Republic: sugar production (metric tons)

| | |
|------|---------|
| 1913 | 86,020 |
| 1920 | 178,558 |
| 1930 | 365,957 |
| 1940 | 454,838 |
| 1950 | 475,333 |
| 1957 | 900,000 |
| 1963 | 794,000 |

Although by 1933 the sugar output had increased by 325% the output of 1913, yet the export value of the crop increased by only 14%. This resulted from the drop in the world market price for sugar. The situation



[Courtesy: Embassy of the Dominican Republic.]

FIG. 56.—Sugar-cane being loaded by modern hydraulic harvesting equipment. Sugar is the republic's most important product.

for the Dominican sugar industry was aggravated by the tight quota system which the United States imposed, by the absence of a large internal market within the republic, and by the fact that the industry was mainly in the hands of a few big foreign corporations. However, the Dominican Government made plans to turn their country into a major world producer and to modernise the industry and increase its efficiency. The Azu-

carera Haina was established with Dominican capital and built one of the largest and most modern sugar-mills in the world—the Central Río Haina, which possesses a milling capacity of 12,000 tons of cane daily and an annual output of about 160,000 tons of sugar. This was followed by the founding of the Azucarera Nacional, which constructed the Central Catarey and later incorporated four other mills. More recently the Azucarera Yaque has been set up and built the Esperanza Works. The Government, in 1951, established the Sugar and Cane Protection Board, whose task is to co-ordinate the general development of the sugar industry and to represent the republic's interests in the field of international negotiations. The enormous increase in the output of sugar since 1950 reflects the importance of these developments.

Wise as these developments may be from the point of view of the Dominican sugar industry, one is compelled to fear that the republic is placing too much reliance upon a single commodity. Sugar normally accounts for between 50 and 60% of the export trade.

The Government, it is true, is aiming to diversify the country's economy, and already much has been done in this direction. Extensive exploration and exploitation of the mineral resources are being carried out. Petroleum has been found in the Azua area, iron occurs in the Hatillo region, and rock salt near Neiba, and there are deposits of gold, copper, nickel, chromite, and bauxite. So far the mineral production is small. The manufacturing industry has expanded during the last generation: the number of industrial establishments doubled between 1937 and 1955 (1342 as against 2915) and the number of people employed in industry doubled likewise (32,000 as against 71,000). The chief developments have been in textiles, cement, pottery, glass, edible-oil processing, and fruit-preserving. So far, however, manufacture and industrial employment are not of any real significance.

The capital and largest town is Santo Domingo (formerly Ciudad Trujillo) (478,000). It occupies the site of the old city of Santo Domingo—the oldest European settlement in the New World—which was practically destroyed in 1930 when a hurricane hit the country. Generalísimo Trujillo at once set to work to re-build the capital and, incorporating all the latest developments in town-planning, built one of the finest and most beautiful cities in the Western Hemisphere. Most of the other towns of the republic are small; Santiago (63,000) is the most important of them. There is a network of good main roads linking the main towns and ports together, but there are only some 60 miles of public railway, the line running from Sanchez to Santiago.

PUERTO RICO

The smallest of the islands forming the Greater Antilles, Puerto Rico has both similarities and dissimilarities with the other islands. The main differences are of a political and demographic nature. Puerto Rico was

acquired by the United States in, as it has been said, a fit of absence of mind after the American-Spanish War in 1898. Up to 1952 Puerto Rico was a so-called unincorporated territory, but in that year it became a free Commonwealth associated with the United States. Puerto Ricans are accordingly American citizens and, in fact, considerable numbers—up to as many as 40,000 a year—have entered the United States. Another unique feature is that the population, which now numbers $2\frac{1}{2}$ millions, is predominantly white (75% approximately) and that this section of the population is increasing more rapidly than that of African ancestry, a feature that is contrary to the usual state of affairs in the West Indian islands.

Physically, Puerto Rico has much in common with the other islands: it belongs to the same structural line, has the same physical diversity, and has a climate similar to that of Cuba and Hispaniola. Puerto Rico is roughly rectangular in shape, being 100 miles long and 40 miles wide, giving it an area of 3,400 square miles. Despite its small size, it has much variety of landform, with a northern coastal plain backed by dry limestone uplands, which, in turn, give way to rolling country and hills and finally a rugged mountain ridge which margins the southern coast. Temperatures are uniformly high all the year round, averaging 73° in winter and 78° in summer, except in the mountains, which are distinctly cooler. Rainfall varies fairly widely according to locality, reaching 180 in. in places in the north-east, which gets the brunt of the Trade Winds and less than 30 in. on the southern lee coast. Vegetation, likewise, exhibits considerable diversity, ranging from tropical rain-forest, through semi-deciduous to dry thorn forest and savanna.

For most of its history and until very recent years the Puerto Rican economy has been almost entirely agrarian. Until the turn of the century coffee was the economic mainstay of the island; since then sugar-cane has been the chief crop. Production is about 1.2 million tons annually, and sugar and its by-products, *e.g.* molasses, rum, alcohol, constitute some 75% of the value of all exports. In spite of the predominance of sugar, there is a considerable variety in the island's agriculture: coffee and oranges as export cash crops (the latter grown on old coffee lands); vegetables, fruit, and tobacco for domestic consumption; and milk production for the towns. Sugar-cane occupies about a third of the cultivated area and is grown principally on the northern coastal plain and in alluvial valleys where the best soils are to be had. Even so, continuous cropping over a long period has led to a serious depletion in soil fertility and large quantities of fertiliser have to be imported and applied. Sugar-cane is grown on large estates. Coffee production is now more or less restricted to the western highlands. The humid northern and central hill country is devoted mainly to tobacco and subsistence crops grown on small farms worked by owner-farmers or on a sharecropping basis.

Although the sugar industry is now supreme and prosperous, dependence upon a staple brings its hazards, and the 1930s was a period of hardship. The economic difficulties of this time led the United States to make

a deliberate attempt to broaden the basis of the Puerto Rican economy. In 1947 the Industrial Incentives Act was passed, whose aim was to foster industrial development. This had the desired effect, for exactly ten years later there were over 400 manufacturing establishments in operation making such things as metal goods, cement, glass, paint, hardboard, and a variety of consumer goods. These newly established industries together with the older industries of sugar-refining, cigar-making, and needlework (which employs 65,000 and is the second largest export industry) support some 10% of the working population. In spite of a relative lack of industrial raw materials, industrialisation programmes are being pressed on with, and the latest development is the proposed oil refinery to be built at Guayanilla together with a petro-chemical plant.

Industrial development has brought in its train many improvements in social welfare, *e.g.* clinics, a reduction in the death-rate and a decline in illiteracy, but industrialisation alone will not be able to secure and maintain a higher standard of living for the Boriquenos, as the islanders are called. Industry at best can only support a minority of the people, so there must be improvements in agriculture, which is likely to remain the firm basis of the Puerto Rican economy. The most pressing needs are for an extension of the cultivated land, the regeneration of worn-out soils, the provision of work during the slack season between harvests, and agricultural education.

The capital is San Juan (589,000), situated on the northern coast; it possesses a land-locked harbour, is the chief port of the island, and one of the busiest in the Caribbean. On the south coast is Ponce, named after Ponce de León, the discoverer of Florida and the first Spanish Governor of Puerto Rico. It is the island's second largest city and a commercial and sugar-shipping centre.

THE BRITISH CARIBBEAN FEDERATION

The idea of federation among the various British Caribbean territories has been a subject of discussion for several decades and from time to time proposals have been put forward, but it was only after the Second World War that specific moves were made to establish a closer association of the territories concerned. Beginning in 1945 with a lead given by the Colonial Office and followed up by the Montego Bay Conference of 1947 and the London Conference of 1953, the federation was brought into being in 1958.

The federal idea stemmed originally from predominantly practical considerations, especially with regard to administrative efficiency and economic welfare. It seemed illogical and irrational to have a multiplicity of administrative set-ups when one might suffice, and it seemed wise and economic to co-ordinate the production and trade of the various territories. The logical necessity for federation and closer relations between

the Caribbean territories seemed obvious, and the advantages to be derived from unification were also patent, but to the peoples of the Caribbean these matters were not fully appreciated nor understood. The climate of political opinion was for long opposed to any closer association, thus federation had to await more auspicious conditions.

Let us, first, look at some of the more important factors which have militated against unity. (1) The islands and mainland territories are widely separated from one another and spread over a distance of more than 2000 miles. (2) Communications, at least until the development of air travel, were dependent upon ships which called infrequently at the islands. (3) The peoples were of differing race, religion, and outlook as a result of their different histories and showed different rates of progress. (4) Some of the islands are densely populated and poverty stricken, and the less crowded and more economically developed islands feared they would be swamped by migrants from the former. (5) The sense of community, the urge to unity, the idea of a common social will are things of recent growth. The obstacles to federation—geographical, historical, cultural, and racial differences which divided the territories—were obviously difficult and not to be lightly dismissed.

On the other hand, there were several factors or conditions urging or making for unity. Perhaps the most compelling reason was economic. Cash crops and a few minerals form the chief bases of the islands' wealth. Federal planning and control of, for example, the sugar industry, alternative crops, new industries, the communications system, agricultural research, etc., together with the development of a common customs union would help to solve some of the economic problems. Another factor was the Second World War, whose exigencies as regards security and supplies necessitated a certain measure of common action which began the process of drawing, linking, and welding the scattered, discrete units together. Again, the creation, in Jamaica in 1947, of the University College of the West Indies did much to foster the idea of unity; not only did it enable peoples from all over the Caribbean to meet and mix but it also acted as a seedbed for intellectuals who usually form the spearhead in new movements. Finally, the natural difficulty of inter-communication between the islands had been largely overcome by the advent of air transport and the development of local air services.

The British West Indies Federation was formally dissolved in May 31st, 1962. In the following August both Jamaica and Trinidad (with Tobago) became independent. Barbados attained independence in November 1966. Early in 1967 the Leeward and Windward Islands acquired self-government within the newly formed West Indian Associated States.

It is to be regretted that the British West Indies Federation foundered. The responsibility for the collapse must lie largely with Jamaica. Without Jamaica the Federation had little chance of success, and when she began to pull out the Federation was doomed.

JAMAICA

The island of Jamaica, which had been a British possession since 1655, when it was captured from the Spaniards, is the largest of the British West Indian islands. 148 miles long and nearly 50 miles wide at its broadest part, it has a total area of 4400 square miles. It is a little less than half the size of Massachusetts.

Jamaica's total population numbers about 1·8 million and, during recent years, has been increasing rapidly. Population density is high. In addition to the Jamaicans, who are predominantly of Negroid strain (about 78% Negro and 18% mulatto), descendants of the slaves who were brought to Jamaica, there are other racial types represented. About 2% are East Indians who came to Jamaica as contract labourers to work on the plantations. There is a sprinkling of Chinese: almost all the small merchandise business is carried on by Orientals. A further 2% are white: this minority is the ruling, controlling, owning element.

Although Jamaica was discovered and conquered by the Spaniards and occupied by them for a century and a half, they have left little impress on the country. The reason for this is mainly because Spanish occupation was essentially superficial in its nature: Jamaica served merely as a supply centre, not as a home for settlers. Hence at the present day Jamaica shows little trace of its Spanish ancestry apart from a number of place-names.

During the latter half of the seventeenth century British settlers, many coming from the North American colonies, began to colonise the island in earnest, and the beginnings of a robust colonial society were laid. Agriculture and trade progressed, especially in connection with sugar, cocoa, and indigo, as a result of the business enterprise of the colonists. Even so, during these early days piracy and slaving were the most rewarding, if infamous, activities. Jamaica became notorious as a great slave mart, and the town of Port Royal was a nest of buccaneers. By the end of the seventeenth century, however, buccaneering had been suppressed and the pirates' capital itself been destroyed by an earthquake.

More orderly development ensued during the eighteenth century. British rule brought law, order, and economic development. British interest in Jamaica, however, was chiefly centred in its products of sugar, molasses, and rum. The abolition of slavery in the early part of the nineteenth century brought a temporary dislocation in the plantation system of agriculture; it was the shortage of labour at this time which led to Asiatic immigrants being introduced to work on the plantations. This Asiatic influx was not sufficiently large to affect materially the racial complexion of Jamaica. And to this day the island is very substantially the creation of the combination of British capital and Negro labour.

The name Jamaica is derived from the aboriginal *Xaymaca*, meaning the Land of Wood and Water. And Jamaica is, indeed, a very beautiful land of hills, forest, rivers, and countless gushing springs. Jamaica is a rugged island, with a highland backbone running from east to west. The Blue

Mountains in the eastern third of the island culminate in the Peak, which reaches an altitude of 7400 ft. The mountains, composed of old igneous rocks, have been much dissected to produce deep valleys and knife-edge ridges. Large areas, more especially the lower slopes and valley bottoms, are thickly forested. Westwards the mountains descend and shelve into broken plateau. Much of the central and western portion of the island consists of limestone plateaus which have all the characteristic features of karst country—bare, eroded surfaces, little surface drainage, numerous subterranean watercourses, gorges, caverns, sink-holes, etc.

Scrub is typical of much of this limestone country, and agriculturally it is of limited value, although here and there some of the karst depressions have accumulations of fertile soil and, as a consequence, are densely settled. In the west-central part of Jamaica is the area known as the "cockpit country," so-called because the solution hollows formed natural pits in which the illegal sport of cock-fighting was carried on. Some of the basins are 500 ft deep and some of great size; one sink is 50 miles long by 20 miles wide. Around the coast are marginal plains, widest in the south and south-east, where there are considerable tracts of alluvium. In some of the alluvial areas near the coast wide expanses of swamp occur. Altogether, only about one-seventh of the island consists of level land.

Jamaica lies south of the northern tropic, but the tropical heat of coastal localities is tempered by the consistent land and sea breezes. In the mountains temperatures are modified by the elevation. Lying in the path of the North-east Trades, which blow over the ocean, heavy rains are experienced on the higher windward slopes. The Blue Mountains generally receive over 100 in. But precipitation varies widely, and parts of the south and west of the island get under 30 in. a year. Over most of Jamaica, however, rainfall is plentiful, averaging over 50 in. Occasionally Jamaica is visited by destructive hurricanes, as happened, for instance, in 1951; this storm was the most disastrous ever experienced (*see* Fig. 54).

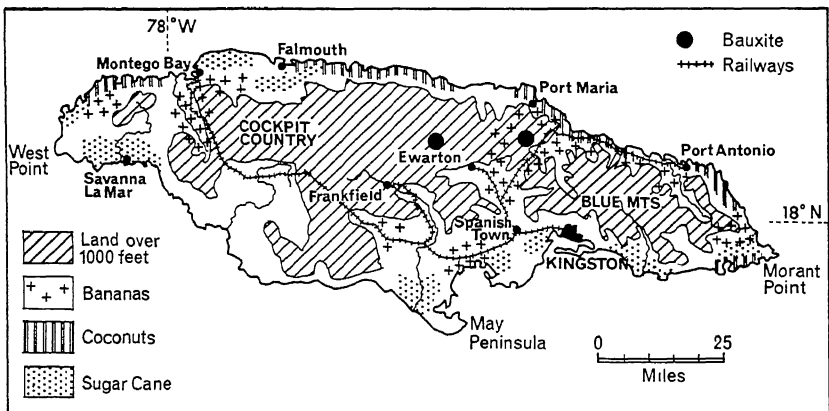


FIG. 57.—Jamaica: general features.

The Jamaican Economy is more diversified than that of most West Indian islands. The people earn a livelihood in a variety of ways, by crop-growing, grazing, fishing, and mining, by handicraft and manufacturing industry, and by catering for tourists. Most of the people, however, make a living by agriculture or by industries closely associated with agriculture, such as sugar-milling, banana-packing, or food processing. Of the population engaged in agriculture approximately half work on the plantations and the great estates and half are engaged in subsistence farming. Agriculture and settlement are largely controlled by relief, soil, and water supply.

Throughout most of the colonial era sugar-cane was the economic mainstay of Jamaica, and was widely grown throughout the island as the ruins of old sugar-mills testify. Nowadays sugar growing is very largely confined to a few large holdings mainly in the southern and western lowlands, much of it being cultivated by irrigation. Cane-growing and sugar-milling are almost entirely in the hands of foreign companies, who with their abundant capital resources can grow on a large scale and treat the cane in large, well-equipped mills.

During the inter-war period (1918-39) bananas replaced sugar as the island's chief export crop. In 1938 over 23 million stems of bananas were exported. Today, however, less than half that number is exported, and sugar, once again, has climbed into first place. In 1965 sugar exports were worth £17.8 million, whereas bananas were valued at only one third that figure. This decline in the banana industry is related to two main facts. During the Second World War and immediately afterwards shipping was not available and the industry could not export its banana crop. Through the stringencies of war the industry thus suffered a severe blow, but more serious was the virulent disease which attacked the plantations and destroyed large areas. The banana plant is very vulnerable to disease. Slowly the industry is recovering from these twin setbacks. Bananas are grown on the northern coastlands of the wetter east, in the west-central area, in the hinterland of Montego Bay, and in lowlands south of Spanish Town, where they are cultivated under irrigation. The Jamaican banana growers sell their fruit to big overseas corporations who have their own fleets of vessels, which are specially equipped to ship the banana stems to Europe and North America.

Jamaica also produces a wide variety of other tropical and sub-tropical crops. One of the distinguishing features of Jamaican agriculture, as compared with that of neighbouring countries, is this diversification of crops. In spite of the importance of sugar and bananas, the agricultural economy is not over-specialised. Coffee, cocoa, coconuts, tobacco, citrus fruits, pimento, and ginger are all grown. Coffee production has declined, but the famous "Blue Mountain" coffee, grown on the north-eastern flanks of the mountains of that name, is of fine quality and fetches high prices in the world market. Cacao trees are grown in the hot, damp, sheltered interior areas; cacao is essentially a small-holders' crop. Pimento, ginger, and tobacco are grown mainly in the limestone areas in central areas of the island.

Jamaica furnishes practically the whole of the world's commercial supply of pimento or allspice. The latter, alternative, name was given to pimento because its scent and flavour were deemed to resemble a mixture of the other spices. Pimento comes from a wild-growing tree of the myrtle family (*Pimenta officinalis*). To make the spice, the clusters of berries are picked in their green and unripe state and then very carefully dried. Output varies from year to year; in 1965 some 2,230 tons were produced worth more than £1 million. Although conditions are suited to tobacco cultivation, tobacco has received little attention until recently: considerable development is now taking place. Citrus fruits, mainly oranges, are a crop of increasing importance, although the industry is being threatened by Israeli and United States competition. Coconuts are grown along the sandy coastal lowlands of the north and east, where the Trades bring persistent breezes; coconut palms thrive best in coastal localities where salt breezes blow.

In addition to the export crops, a variety of crops are grown for the local market. Maize, rice, yams, and a wide range of fruits and vegetables are produced.

Animal husbandry plays a relatively small part in the Jamaican economy. Small numbers of sheep are reared, and there are some 350,000 goats. The donkey has long been used for purposes of transportation. During recent times cattle-breeding for the dairying industry has taken place on an increasing scale, and a breed of dairy cattle, known as the Jamaica Hope, has been produced which is suited to tropical conditions. So successful is this strain that it is already being exported to other tropical countries.

The mining and processing of bauxite and secondary industry are becoming increasingly important. Large deposits of bauxite, the ore from which aluminium is made, are worked by four companies, one of which processes the bauxite into alumina in Jamaica. Jamaica is the leading world producer of bauxite. In 1965 she exported 8.5 million tons. The bauxite mines in the Mocho area are now being connected by a short railway line to Rocky Point. Gypsum is also mined. Industries include the processing of local products such as sugar, coconuts, tobacco, and citrus fruits (for fruit juices), the making of cement, the manufacture of garments and footwear, and corrugated cardboard containers.

A considerable and growing industry is tourism. By virtue of its delightful climate and fine scenery, Jamaica provides a great attraction, and increasing numbers of tourists (316,604 in 1965) are visiting the island. The Government is encouraging the development of Jamaica as a popular resort centre. The airport near Montego Bay is a busy terminal bringing visitors to the island, and the town of Montego Bay is growing rapidly as a tourist centre, for the coast hereabouts with its coves and fine beaches offers wonderful bathing facilities.

Towns and Ports. The towns of Jamaica are of considerable interest. In the first place, they are nearly all coastal functioning as ports and, in the second place, apart from Kingston, the capital and chief port, they are

small. Most of the population lives in numerous villages which are scattered throughout the island.

Kingston (377,000) lies on the southern, sheltered shore of the island and possesses a magnificent natural harbour which is enclosed and protected by a long sandspit called the Palisados, at the end of which stands Port Royal, the site of an old fortress which guarded the entrance to the bay. The original fortress of Port Royal was almost completely destroyed by a disastrous earthquake. Kingston itself suffered severely from another earth tremor in 1907 and had to be practically rebuilt. The city is well laid out on a rectangular grid pattern. While the main thoroughfares with their public buildings and business premises are solid, handsome, and clean, there are many streets which are nothing more than slums. On the outskirts of Kingston, towards the mountains, there are beautiful suburban areas where the wealthier citizens live.

About 15 miles west of Kingston is Spanish Town (12,000), the former capital, whose name is a reminder of its Spanish ancestry. Port Antonio, one of the chief centres of the fruit industry with an important export trade in bananas, is the main outlet for the north-eastern part of Jamaica. In the north-west is Montego Bay, linked by railway to Kingston.

There are about a dozen other small towns having populations of two or three thousand. They are principally ports used mainly for the export of a particular commodity, such as bananas, sugar, or bauxite. The rest function as local marketing centres.

The numerous village settlements usually consist of a compact collection of wood and thatch dwellings. These dwellings are often rude shacks providing little else beyond shelter. Living conditions generally are primitive. Almost every village has its general store selling small merchandise, whose proprietor is usually Chinese.

Jamaica's Problems. In spite of the fact that the absence of any major stable industry has encouraged a more diversified development of economic activities, Jamaica has serious economic problems. Natural vicissitudes such as droughts, hurricanes, and plant diseases combined with the uncertainties of world marketing conditions have led to periodic booms and slumps. The development of Jamaica's mineral resources, the encouragement of the tourist trade, and the expansion of light industry will do much to lessen the impact of these economic ups and downs.

It is estimated that roughly half the people engaged in agriculture are unemployed for half the year. The problem of unemployment and under-employment is a thorny problem for the administration and has received much attention, although it is only fair to say that much of the unemployment is quite voluntary. A generally lax attitude to work and a low per capita output are not conducive to economic efficiency. "A badly balanced diet, an enervating climate, and the legacies of bygone slavery, including asexual promiscuity with corresponding tenuous family attachments," says E. W. Evans,* "all militate against efficient production."

* *Britannia Overseas*. Nelson. 1946. P. 79.

Perhaps the most serious problem, however, is that of over-population. Reference has already been made to the rapid growth during recent times, and with increased medical attention and facilities this expansion is likely to be accelerated rather than slowed down. An examination of vital statistics shows that the infant mortality rate and the overall death-rate are gradually decreasing, while the birth-rate is increasing. The latter, in 1965, was 39.4 per thousand, the highest in the world.

During the earlier years of the present century the problem of population pressure was eased to some extent by emigration. Indeed, Smith and Philips wrote: "The chief export of Jamaica might well be said to be young Negroes tempted by greater wages in lands of greater resources. They go chiefly to the cane fields of Cuba, the banana plantations of Central America, the mahogany camps of British Honduras, and the United States."* To this list we might add Great Britain, for many thousands have migrated to that country since the end of the Second World War. Emigration is less easy now than formerly, and in the last resort the problem of surplus population is one that will have to be tackled and solved internally by Jamaica.

THE CAYMAN ISLANDS

The Cayman Islands lie 100-200 miles north-west of Jamaica, of which they were dependencies until 1959. They are three in number, Grand Cayman, Little Cayman, and Cayman Brac, whose combined area totals 100 square miles. All are low-lying coral islands. The population of the islands is about 9000 all told. Georgetown, in Grand Cayman, population 1500, is the chief town.

The Caymanians, living in close contact with the sea and limited by the restricted possibilities of the environment, have turned to the sea and become expert sailors. Seafaring is the mainstay of the economy. The only local industries are fishing, rope-making, boat-building, and the catching of turtle. Turtle-fishing is a major activity. The Caymanian fishermen go to the cays off the Honduran and Nicaraguan coasts which are important habitats of the turtle, capture the creatures, and bring them back to the Caymans to fatten, whence they are taken to Jamaica for shipment abroad. Of the marine species of turtle, two are of especial value. The most prized is the Green Turtle, from which turtle soup is made; the Hawksbill Turtle provides the tortoiseshell of commerce. Tortoiseshell was much in vogue a generation or so ago, but is now in much less demand.

THE LEEWARD ISLANDS

The small islands which form the tail of the island arc of the Greater Antilles are known, generally, as the Lesser Antilles, but in official British parlance they are called the Leeward and the Windward Islands, since two groups are distinguished. It should be noted that these terms refer purely to the British members of the Lesser Antillan arc (Fig. 58).

* *Op. cit.*, p. 834.

The Leeward Islands—so-called, it is usually held, because the winds commonly blow from the east in those quarters—comprised before the formation of the British Caribbean Federation a single colony which was divided into four Presidencies: Antigua, with Barbuda and Redonda; St. Christopher (commonly called St. Kitts), Nevis, and Anguilla; Montserrat; and the British Virgin Islands. Belonging geographically, though not politically, to this group are the French island of Guadeloupe and the American Virgin Islands. The islands as a whole fall into two categories: an outer arc of low-lying coral limestone islands and an inner arc of high volcanic islands. Although the islands differ greatly in appearance, underlying economic and social characteristics provide a common denominator. Originally dependent upon sugar production, they do not now depend upon any substantial cash crop; rather is the economy one of diversified agriculture. The peasantry are poor and there is a fairly high ratio of urban to rural population. Most of the islands have a rather decayed colonial air about them.

Antigua is the largest of the Leeward Islands; it has an area of just over 100 square miles. Although there is a hill, Boggy Peak, 1300 ft high in the south-western part of the island which is of volcanic origin, Antigua is mainly a coral island. Topographically, it consists of a low-lying and comparatively flat limestone plateau. An irregular coastline provides numerous sheltered coves and harbours, although fringing reefs greatly limit their usefulness. The climate is one of alternating wet and dry seasons, and sometimes there is an acute shortage of water during the dry season, a condition which is aggravated by the fact that there are few surface streams. The porous limestone allows the water to percolate through, and there is, therefore, much dependence upon wells for local water supplies. Much of the island is given over to the cultivation of sugar-cane and there is a sugar central. Cotton now covers a considerable area and is the second most important crop. Onions and tomatoes are also grown for export. The total population numbers just over 63,000, with almost a quarter living in St. Johns, the chief town of the colony. Barbuda, 30 miles to the north of Antigua, is a relatively barren island and musters only about a thousand inhabitants. Redonda is uninhabited.

St. Kitts, Nevis, and Anguilla were united in 1882 to form a Presidency. St. Kitts and Nevis are similar, both being mountainous volcanic islands, and are separated only by a 3-mile-wide strait. Anguilla, on the contrary, is a low coral island. St. Kitts was the first island in the West Indies to be colonised by Britain (1623), and tobacco was soon being grown here by the settlers. Today sugar is the chief crop. In spite of a high rainfall the porous volcanic soils ensure good drainage needed by both sugar-cane and cotton, the second crop. Much of the island's 68 square miles is covered by sugar estates. Basseterre, on the leeward side of the island, is the chief town. Although Nevis is only slightly smaller than St. Kitts, its population of about 15,000 is less than half that of its sister island. This is probably explained by the less fertile character of Nevis: there are fewer areas

fit for cultivation and the soils are stony. The peasant farmers grow cotton and vegetables on the small areas of good soil and raise cattle and mules on patches of grassland. The chief settlement and port for Nevis is Charlestown. Anguilla contrasts strongly with St. Kitts and Nevis. Belonging to the outer arc of coral islands, it is a long, narrow island 35 square miles in area, with poor, dry, limestone soils. A poor scrub vegetation supports small stock, and there is a little cotton cultivated on the better soils, but mostly the people live by evaporating sea-water in salt-pans to produce salt, which is the island's principal product. The total population of Anguilla is slightly less than 6000.

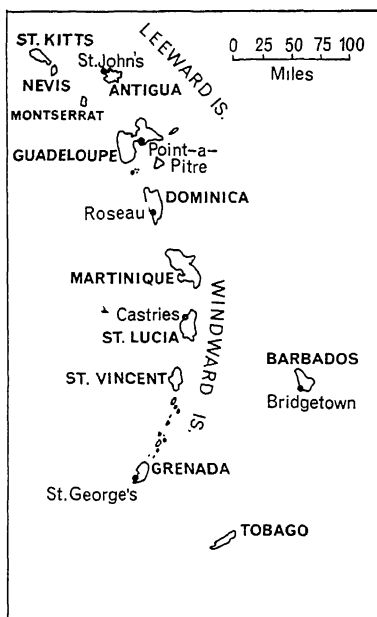


FIG. 58.—The Leeward and Windward Islands.

Montserrat is a small island, approximately the same size as Anguilla. It is about 11 miles long and 7 wide. Scenically, it is one of the most beautiful of the Antillean islands. Mountainous for the most part with rugged well-wooded hills separated by deep valleys, it is an island full of tropical charm. Its French name, meaning "Tooth Mountain"—from the two peaks in the island—derives from the period when the island was held by France. Montserrat is mainly volcanic in origin, as the three active *soufrières* and a number of hot springs testify. The volcanic rocks have weathered to produce rich, black soils, while even the beach sands are black. About one-third of the island is under cultivation, and the economy, which is based purely on agriculture, depends upon the growing of Sea Island cotton, limes, and such vegetable crops as tomatoes, onions, and carrots. In the hills sugar-cane is grown, solely for the distillation of rum.

But Montserrat, at present, is unable adequately to support its population of some 14,000 and there is a constant stream of emigrants; during recent years several hundred to a thousand people have sailed to Britain each year. Improved communications in the island, the opening up of the south-eastern area, the expansion of market gardening and cattle-breeding, the introduction of a few simple industries, and the development of a tourist trade would do much to solve Montserrat's economic problems. Plymouth is the only town; it lies on the sheltered side of the island but has no harbour, and ships have to anchor in the open roadstead.

The Virgin Islands, of which there are several dozen islands and islets, are shared between Britain and the United States. The British islands total about 67 square miles. Tortola is the largest. The population of the islands, numbering between 7000 and 8000, live mainly by farming and fishing. Most of their produce goes to the American Virgin Islands, with whom the British Islands have close social and economic ties.

THE WINDWARD ISLANDS

The Windward Islands stretch southwards from the Leewards towards Trinidad. The four major islands—Dominica, St. Lucia, St. Vincent, and Grenada—form four colonies within the Federation. Their total area is 821 square miles, practically twice that of the Leeward Islands, while the combined population of just about a quarter of a million is slightly more than double that of their northern neighbours. The Windward Islands are all mountainous, volcanic in origin, and very picturesque. Climatically they are warm and wet, receiving much heavier rainfall than the Leeward Islands, although during the winter months conditions generally are very pleasant. The islands are thickly forested with a luxuriant tropical vegetation. The north-eastern or windward sides of the islands are drenched with rains and heavily wooded, so that they are almost uninhabited; population is concentrated on the drier, sheltered leeward sides.

Historically the Windward Islands were significant producers of sugar, but due to a number of factors—the abolition of slavery, the small-scale production, the exhaustion of the soils, the competition from beet sugar, and the international regulation of sugar production—the industry declined. The small family estates found it impossible to compete in the world market with the big sugar corporations. The collapse of the sugar industry brought impoverishment to many, but it also focused attention upon other crops, especially tree-crops, for which the topographic and climatic conditions are well suited; hence today a considerable variety of crops is produced, *e.g.* cacao, coffee, bananas, limes and other citrus fruits, coconuts, vanilla, arrowroot, and spices. Unfortunately the Second World War, fluctuations in world prices, the occurrence of blights and pests, and damage wrought by hurricanes have brought economic hazards and uncertainty.

Dominica is not only the largest of the Windward Islands, with an area of 305 square miles, but the loftiest, since it rises up to an elevation of 5000 ft.

It is in fact a very mountainous and rugged island with numerous rushing streams. Heavy rains, as high as 300 in. a year, fall on the exposed north-eastern slopes, but in the lee of the island the precipitation is much reduced, some of the sheltered valleys receiving only about 50 in. Approximately one-third of Dominica is under crops which flourish on the very fertile volcanic soils. The exports consist principally of bananas, lime fruit products (now less important than formerly), cocoa, copra, and vanilla. Agriculture claims most of the population and is in the hands of small farmers. Though the largest of the Windward Islands, Dominica is the most thinly peopled; it has a total population of about 60,000, a fifth of whom live in Roseau on the south-west coast. An interesting feature of the island is that here is to be found what is virtually the last remnant of the original Caribbean people—the Caribs; there are about 400 of them, but less than 50 are pure-blooded.

St. Lucia is the second largest island and generally said to be the most picturesque. The scenery is lavish, with mountains and ravines smothered in lush tropical vegetation. Throughout its 27-mile length runs a mountain spine with several peaks reaching 3000 ft and over. As in Dominica, the windward side of the island and the mountains in the centre receive abundant rainfall. Wet and dry seasons are distinguishable, however. *St. Lucia* was long a bone of contention between Britain and France, and changed hands several times until it finally became British in 1814. French cultural influence is still strong among the 95,000 inhabitants of the island; this is evident in the place-names, in the French patois spoken, and in the prevailing Roman religion. Of all the Windward Islands *St. Lucia* is the only one in which the cultivation of sugar-cane remains important; it is the leading crop. Other crops, exported in small quantities, are cacao, bananas, lime juice, coconuts, copra, and vegetables. *St. Lucia* possesses in Castries, the principal town, one of the finest harbours in the West Indies; this magnificent almost land-locked natural harbour provides safe anchorage in the hurricane season and can accommodate large ocean-going vessels. Not unnaturally, Castries was developed as a naval base and coal-bunkering station, but it has declined in importance. Few towns have such a superb setting.

St. Vincent has an area of about 133 square miles, is 18 miles long from north to south and 11 miles wide, and has a population of some 80,000. Associated with *St. Vincent* are the northern Grenadine Islands, which were dependencies of *St. Vincent* when it was a colony. The main island has a mountainous backbone of volcanoes, one of which *La Soufrière* (4048 ft) erupted in 1902, causing much damage. The island experiences heavy rainfall, but there is a fairly well-marked division into wet and dry seasons. The occurrence of a dry season in conjunction with the porous soils favours the cultivation of cotton, and the island is noted for its Sea Island cotton. A specialised commercial crop peculiar to *St. Vincent* is arrowroot, obtained from the rhizome of *Maranta arundinacea*, a plant native to tropical America. Other crops are sugar, cacao, bananas, cassava,

spices, and copra. Of the Windward Islands, St. Vincent is the most thoroughly British. The chief town and port is Kingstown (16,000) located in the south-west on the sheltered shore of the island.

Grenada, the fourth island of the Windward group, lies nearly 70 miles S.S.W. of St. Vincent, with which it is comparable in size. In common with the other islands it has a mountain core, but there are fewer steep slopes and more low-lying areas. Altogether the scenery is less spectacular, but the physical conditions are more favourable for agriculture. Once again, there are volcanically derived soils of great fertility. Another distinguishing feature is the greater diversity of crop production, which is more especially in the hands of peasant proprietors. The list of products is long and includes cacao, sugar, coconuts, cotton, limes, citrus fruits, and spices, especially nutmegs. The population is largely of African descent and "in none of the islands has the absorption of whites into 'near whites' been so complete as in Grenada."* St. George's (27,000), formerly the seat of government of the Confederacy, is situated on the sheltered south-west coast and has a good harbour. Attached to Grenada are some of the Grenadines, which form a string of small rocky islands between Grenada and St. Vincent. The most important of them is Carriacou. The 7000 inhabitants are mainly concerned with the growing of a short-stapled variety of cotton.

BARBADOS

Barbados is situated to the east of the Lesser Antillean arc and stands by itself. It is a small pear-shaped island, 166 square miles in area, which makes it slightly larger than the Isle of Wight. Barbados is of special interest for two reasons: the high proportion of its cultivated area and the high density of its population.

Barbados differs from most of the other British West Indian islands in that it was always in the possession of Great Britain; it is among the oldest of the former colonial territories. Its long British associations and its essentially British complexion have earned it the nick-name of "Little England." Settled by the English in the early part of the seventeenth century, it became, first, a land of tobacco planters; but soon sugar-cane ousted tobacco, and sugar has been paramount in the economy ever since. Out of a total area of 106,000 acres, 68,000 are cultivated, of which about 34,000 are devoted to the large-scale production of cane-sugar. As elsewhere, the early sugar industry was based upon imported Negro slave labour, but when emancipation came the industry survived the change which in other places brought disaster.

The structural core of the island is a ridge, scarcely anywhere in excess of 1000 ft, which trends roughly north to south-east, but most of the island is built up of coralline limestone. Apparently successive uplifts of fringing coral reefs have produced a series of limestone terraces or platforms. Much of the surface, therefore, is level or nearly so. Because of the

* EVANS, E. W. *Britannia Overseas*. Nelson. 1946. P. 150.

porous coral limestone there are few surface streams. Drainage is largely subterranean, and water supplies are got from wells. There is no shortage of water, however, and supplies are piped throughout the island. The limestone has weathered to give very fertile soils whose richness has been maintained by careful husbandry and the use of manures. Eastwards and northwards the land slopes upwards to low hill country composed of sands and shales; in these rocks oil has been found, and a small oilfield is exploited commercially. Beyond these foothills lies the main ridge. East of the ridge the land falls steeply and gives a corrugation of jutting spurs and deep valleys. Apart from this rugged eastern slope, Barbados is lacking in scenic grandeur.

Barbados has a Trade Wind climate. The North-east Trades sweep across the island, bringing moderate rainfall, which is usually sufficient for the crops; occasionally however, the rains fail, drought ensues, and the crops are ruined. Another hazard is the hurricane, though these, fortunately, are not very common. The cool sea breezes temper the heat so that the climate is quite suitable for whites.

The Barbadian economy is dependent almost wholly on sugar and its derivatives, molasses and rum. The cane fields, indeed, seem to cover the island save for patches of subsistence crops, for almost every plantation labourer has a small plot on which he grows "ground provisions"—yams, plantains, cassava, beans, squashes, and breadfruit. The cane is grown either on family estates or on peasant small-holdings.

A major problem facing Barbados is that of over-population. On this small island live over a quarter of a million people; this gives a density of 1423 persons to the square mile—one of the highest in the world. The island has reached saturation point, and many Barbadians are emigrating overseas. The population is essentially rural, there being only one town of any size; this is Bridgetown (19,000), the capital and port, so-called because it lies on the banks of a small creek spanned by a stone bridge.

TRINIDAD AND TOBAGO

Trinidad is the second largest and most southerly of the British West Indian islands. With an area of 1864 square miles it is about half the size of Wales, to which, in shape, it bears some resemblance. It lies some 10 degrees N. of the equator opposite the delta of the Orinoco and close (only 7 miles away at the nearest point) to the northern coast of South America. In point of fact, Trinidad is, both structurally and geographically, a South American rather than a West Indian island. Tobago, which was amalgamated with Trinidad in 1898, is 116 square miles in area and lies 19 miles to the north-east.

Trinidad exhibits considerable variety of physical conditions. In the north a mountain system, the Northern Range, stretches from west to east across the entire width of the island; this range is, in reality, merely the continuation of the coast range of Venezuela. Two peaks, Aripo and El Tucuche, top 3000 ft. The Northern Range intercepts the Trade Winds

so that heavy rains, up to 100 in. and more, are experienced and the mountains are as a result heavily forested and deeply ravined. Across the middle of Trinidad runs a low ridge of hills, 500-1000 ft high, known as the Central Range, which trends diagonally W.S.W. to E.N.E. Running parallel with the southern coast is the Southern Range, but this is very much lower than its northern counterpart. The central portions of the island, lying between the Central Range and the coastal ranges, are level or undulating and contain several areas of swamp land, *e.g.* the Caroni swamp and the Nariva swamp. The two western peninsulas enclose an extensive but shallow stretch of sea known as the Gulf of Paria.

The climate of Trinidad is tropical. Temperatures are high, ranging from 70° to 88° F (21° to 31° C), while the rainfall varies between about 120 in. in the north-east and under 60 in. in the west of the island. There is abundant rainfall on the whole, no part being dry, although a relative dry season is experienced between January and May. Trinidad is, fortunately, free from the hurricane menace.

The population of Trinidad is slightly over 850,000; that of Tobago is 37,000. The population is extremely mixed and the ethnic composition is roughly as follows: 47% of African ancestry; 36% Hindu and East Indian; 3% European; 2% Chinese; and 12% of mixed blood. The place-names of the island reflect the many cultural strands in the Trinidadian fabric. It is worth noting that the Indian and East Indian elements, which account for more than a third of the total population, expressed the strongest opposition to the Caribbean Federation; underlying their protest was the fear that they would come under the domination of the West Indian Negro. It cannot yet be said that Trinidad is a melting pot of peoples and cultures, although the English language is gaining ground and education will do much to change ancestral habits and customs.

Approximately one-third of Trinidad is cultivated. The two chief cash crops are sugar and cacao. Sugar-cane is cultivated on the flat, low-lying western coastal plains where it is drier, cacao in the warm, moist, sheltered valleys of the Northern Range. Subsidiary crops are coconuts, coffee, bananas, and grapefruits. The coconut palm grows along the northern and southern shores and over a wide area of the eastern coastlands, where the sea breezes and sandy soils suit it well. Coconuts and coconut products, such as copra and coconut oil, are significant items in the export trade. Sugar-cane and cacao are grown mainly on large company-owned estates, but outside the sugar and cacao areas there is much land in possession of Indian small-holders.

Of much greater importance, at least from the point of view of Trinidad's export trade, is the island's mineral wealth, which provides over 80% by value of the exports. Trinidad is well known as a producer of pitch and petroleum. Trinidad is one of the very few places in the world where natural pitch or asphalt occurs. Not far from the town of San Fernando and near the village of La Brea, is the Pitch Lake. It was

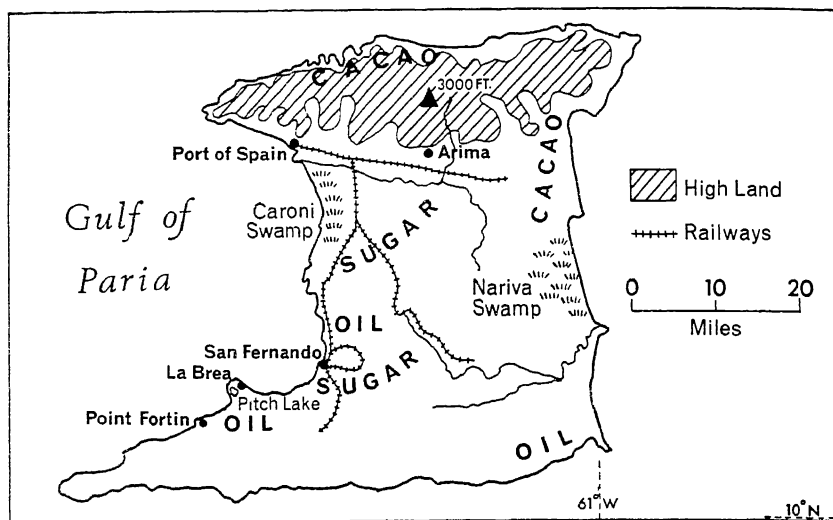


FIG. 59.—Trinidad: general features.

discovered in 1595 by Sir Walter Raleigh, who found that the hard, sticky substance was excellent for caulking ships; ever since Trinidad has profited from this remarkable natural resource. The asphalt lake is 114 acres in extent. The resource, though long exploited, appears to be inexhaustible; almost as fast as the pitch is extracted new pitch oozes into the lake from subterranean sources. The lake's level has dropped only 10 ft, despite the many millions of tons extracted, and bore-holes have found no bottom at 200 ft. The pitch is dug out, melted and barrelled for export (Fig. 60). Some 200,000 tons are extracted each year.

Much more important than asphalt, however, is petroleum, which occurs in the Tertiary rocks of the hill country in southern Trinidad. Today the island's economy is virtually based on oil, and in 1962 over 48 million barrels were produced, while in the same year oil accounted for three-quarters of the total exports. In addition to refining its own crude petroleum, Trinidad also refines large quantities of Venezuelan oil. The refinery at Pointe-à-Pierre is the largest plant outside the U.S.A.

Apart from oil-refining, sugar factories, and a number of other processing industries, Trinidad has had little in the way of manufacturing in the past, but during the last decade notable advances have been made in this direction. Industrial development has been encouraged and a variety of industries, including cement, bottle, paint, plastics, textiles, clothes, cardboard, and chemical industries, are already in operation or planned.

Port of Spain (130,000) is the capital and chief port and by far the largest town. A 3300-ft-long wharf allows large vessels to berth; this wharf is necessary, since the inshore waters are shallow. Port of Spain serves as an

entrepot port for the other West Indian Islands. A few miles east of the capital lies St. Joseph, the old capital, and farther inland still Arima (11,000). Some 30 miles south of Port of Spain is Trinidad's second largest town San Fernando (36,000); it lies at the western end of the central hill ridge up which its streets climb dizzily.



FIG. 60.—Pitch Lake, Trinidad. On the edge of the large oilfields around San Fernando, the Pitch Lake was caused by a natural eruption of oil and was first observed by Columbus. Workers use a special matlock to dig the pitch. Some is used in Trinidad (25,000 tons annually) for surfacing the roads. The remainder is refined and exported to the United Kingdom, Australia, Denmark, and Japan.

Tobago is a mountainous, forested island, and only about a quarter of the surface is under cultivation. Cacao and coconuts are the chief products. A beautiful and healthy island, Tobago has developed as a tourist centre. Scarborough (15,000) is the chief town and port. Tobago is linked to Trinidad by daily air services. Tobago, incidentally, is believed by many to have been the island which Daniel Defoe had in mind when he wrote *Robinson Crusoe*.

THE FRENCH WEST INDIES

France possesses two islands, Guadeloupe and Martinique, in the West Indies. They are the remnants of the former more extensive Caribbean colonial territories. Though since 1946 both islands have had the status of departments of metropolitan France, they remain completely colonial in their character. They are separated by the island of Dominica and lie roughly 100 miles apart. Together they have an area of just over 1000 square miles, and a combined population of rather more than $\frac{1}{2}$ million. Geographically, Guadeloupe belongs to the British Leeward Islands, Martinique to the Windward Islands. French occupation and settlement dates from 1635, though subsequently both islands were occupied for periods by British forces.

GADELOUPE

Guadeloupe really consists of two islands, twin islands, Basse-Terre and Grande-Terre, separated by a very narrow sea channel known as the Riviere Salée (Salt River). Together they have an area of 583 square miles. Basse-Terre, the western island, is the larger. Physically, it is rugged, with hill ridges, high uplands, and mountain peaks. In the south is the volcano of La Soufrière (4870 ft), which erupted in 1797 and 1843, causing on both occasions considerable damage. Today, the only signs of its waning activity are thermal springs and solfataras. While Basse-Terre belongs to the inner belt of volcanic mountainous islands, Grande-Terre belongs to the outer low-lying coralline islands. Grande-Terre, smaller than its twin, is an irregularly-shaped island nowhere higher than 450 ft. It is composed of limestone, derived from coral accumulations, and *macoonne du bon dieu*, a conglomerate of shattered shells and sand which is much used as a building stone. Because of the porous nature of the rock Grande-Terre possesses few streams, and the inhabitants have to depend for their water supplies on small ponds and cisterns. Basse-Terre, in contrast, has a water problem of a different kind: too much water, for during the rainy season its many streams are prone to sudden flooding. Much of Basse-Terre is forested.

Sugar plantations, worked by Negro slave labour, were established by the French, and sugar is the traditional crop. Almost 100,000 acres are devoted to sugar-cane, mainly on Grande-Terre, and sugar and rum make up most of the exports. The sugar industry is not very efficient, and but for preferential treatment accorded by the French Government the industry would be in a sorry state. A considerable range of tropical crops is grown, including bananas (now second in importance), cotton (now being cultivated in increasing quantities), coffee, cacao, citrus fruits, and vanilla.

The total population is in excess of quarter of a million, the majority being Negro or strongly Negroid in ancestry. The only exception to this general statement occurs in Les Saintes Islands, where the population is predominantly European—of French extraction. The coloured labourers

are poor and live in wretched circumstances; their diet is ill-balanced, and many are addicted to drink. Although Basse-Terre (12,000) is the capital of Guadeloupe, the biggest town is Pointe-à-Pitre (42,000). The latter, possessing a fine harbour, has become the chief commercial centre of the colony; it handles about 85% of the total trade.

MARTINIQUE

The island of Martinique resembles Basse-Terre: it is roughly the same size, it is rugged with few plains, it is heavily forested, and tropical plantation crops, especially sugar and bananas, are the basis of the economy. The dominating physical feature of Martinique is Mt. Pelée in the extreme north of the island, which rises to 4430 ft. This volcano erupted violently in 1902, spewing out incandescent gas, hot ash, and lava, which overwhelmed the town of Saint-Pierre and killed 40,000 people all told. The most extensive plains occur in the southern portion of the island. The broken coastline provides several good harbours. The climate generally is hot and wet on the coast: temperatures are between 75° and 80° F (24° and 27° C), and very heavy rains are characteristic of the windward side. In the mountains it is somewhat cooler and more healthful and there are several sanatoria. Hurricanes frequently sweep across the island during the period August to October, leaving destruction in their wake.

About a third of the island is under cultivation, with sugar-cane as the dominant crop. A considerable quantity of bananas and some coffee, cacao, and pineapples are also produced. The people, mostly Negroes, are engaged in the growing of these crops or in sugar-milling, rum distillation, fruit-canning, and fruit-packing. Sugar, rum, and bananas are the chief exports and are shipped mostly to France. Practically the whole of Martinique's trade is with the home country.

Fort de France (65,000) is the largest town, the seat of government, and the principal port. It is situated on the sheltered, leeward side of the island. Saint-Pierre, once the largest city, now has only some 6000 people; it has never recovered from the disaster of 1902.

THE NETHERLANDS WEST INDIES

The Dutch possessions in the West Indies fall into two groups of small islands more than 500 miles apart: the islands lying off the coast of Venezuela, Curaçao, Aruba, and Bonaire; and the islands in the Leeward group, Saba, St. Eustatius, and part of St. Martin (shared with France).

The former comprise the more important group, not only in terms of area and population but also economically. Curaçao, 40 miles from the Venezuelan coast, is the largest of this southern group of islands, having an area of 178 square miles. It is a hilly and rather arid island encircled with coral reefs. The soils are not infertile, but the scantiness of the rainfall handicaps their usefulness for cultivation. However, Curaçao's main concern is with oil not agriculture. The chief activity is oil-refining, and

the whole island reeks of petroleum. The first refinery was built in 1916 to crack crude oil imported from Venezuela. The Royal Dutch Shell refinery at Willemstadt is now one of the largest in the world and employs nearly 12,000 people.

Willemstadt (47,000), the capital of the entire Dutch Antilles as well as Curaçao, possesses a very fine harbour capable of accommodating the largest ocean-going vessels, a factor of considerable importance to its oil traffic. It is also an important port of call for many shipping lines and carries on a large transshipment trade, especially with Venezuela. The old part of the town, with its narrow streets and gabled houses, is very reminiscent of traditional Holland. The inhabitants of Willemstadt, and of Curaçao generally, speak an interesting *patois* known as *Papiamentu*, which is basically a mixture of Spanish and Dutch.

While the refining of imported petroleum dominates the economy of Curaçao, there are one or two local products of interest. The mining of phosphatic rock is carried on, the collection of the pods of the divi divi tree, used for tanning, is undertaken, and the preparation of orange peel, for the making of the well-known Curaçao liqueurs, is a unique activity.

Some 50 miles north-west of Curaçao is Aruba, 70 square miles in area, which has been developed as another oil-refining centre; here there are two refineries, one at St. Nicolas (one of the largest refineries in existence), the other at Oranjestad.

The Dutch Antillean islands are small islands, volcanic in origin, having a warm, damp climate. Economically, they are of little importance. On small patches of cultivable land, small quantities of Sea Island cotton, sugar-cane, and maize are cultivated. St. Martin has a salt industry, based on the evaporation of sea-water. Saba's inhabitants have a reputation as seamen and boatbuilders. The combined population of the three islands runs only to a few thousand.

THE BAHAMAS

The Bahamas consist of an archipelago situated to the south-east of Florida and to the north-east of Cuba. Of the large number of islands, islets, and rocks, whose total aggregate area is about 4403 square miles, 25 are inhabited. The population numbers just about 150,000 altogether, but fully a half lives on the small island of New Providence, on which is situated Nassau, the capital of the colony. Watling's Island, Columbus' first landfall on his epoch-making voyage of discovery, is one of the islands.

These scattered islands extending over some 750 miles are coral islands, generally long, narrow, and low-lying. The islands are formed of coral limestone and coral sand. The soils which overlie the hard but porous rock are mostly dry and shallow and not very well suited to agriculture. Moreover, as a result of the porosity of the rock sea-water has been able to percolate through it and has led to some of the land becoming impregnated

with salt. In fact, the securing of fresh water presents something of a problem, and rain-water is caught and stored.

Sub-tropical climatic conditions prevail. Warmed by the Gulf Stream in winter and cooled by the sea breezes in summer, characterised by clear, blue skies with much sunshine and little rain, the climate is almost ideal; the winter climate particularly is delightful. Frost is unknown, for the warm Gulf Stream current maintains a temperature above 50° F (10° C) minimum. Average winter temperatures are in fact around 70° F (21° C). The summer heat is tempered by sea breezes, but it may reach 90° F (32° C). Rains are chiefly confined to the period mid-May to mid-November. The pleasant, healthful climate is one of the Bahamas' chief amenities, which it has capitalised to the full.

Geographically, the Bahamas belong to the West Indies, but the people dislike being associated with them. And the Bahamas are not, of course, a member of the British Caribbean Federation. There are, however, fairly sound reasons to support this egotistical attitude: firstly, the Bahamas have always been in British hands, hence the islands have never suffered alien rule or cultural influence; secondly, there never developed the plantation economy which is such a characteristic feature of the West Indies generally; and thirdly, the Bahamas do not depend, as most of the other islands do, upon the export of agricultural or mineral commodities. Thus in several important ways the Bahamas forms a colony unlike its West Indian neighbours.

The Bahamas have had a chequered and frustrating history. Settled by the British during the seventeenth century, with many colonists coming from Bermuda, the inhabitants developed a penchant for piracy which, naturally, brought Spanish retaliation, and the settlement on New Providence was attacked and sacked several times. During the next century the secession of the North American Colonies from Britain led to many loyalists migrating to the Bahamas, where they introduced cotton cultivation. For a while the industry prospered, but subsequently it declined, and to support themselves many of the islanders resorted to the deliberate wrecking of ships. When this was stamped out the colony served as a supply base to Confederate blockade runners during the period of the American Civil War. It was not until the present century that the colony turned to more legitimate business and adopted a mantle of respectability.

The colony set out to exploit its natural beauty and salubrious climate and it has built up a prosperous tourist industry. New Providence is the main attraction and Nassau the principal resort. All the ingredients necessary for a successful tourist industry—abundant sunshine, beautiful scenery, sparkling seas, fine beaches, a wealth of flowers, and sumptuous hotels—are here in plenty. Nassau itself is a strikingly beautiful town with numerous trees and gardens. But undoubtedly the most important factor in the growth of the Bahamas tourist trade is the nearness of the colony to the United States. Within a matter of a few hours wealthy Americans can exchange the rigours of winter for the delightful, balmy conditions of

New Providence. Thus tourism has come to be the economic mainstay in the life of the islands. The value of the tourist trade is estimated at about £20 million.

New Providence is the hub of the Bahamas, yet territorially it is only a very small fraction of the colony. Even so, the rest of the islands, known as the Out-Islands, in combination do not compare with New Providence. The Out-Islands are for the most part fringed with coral reefs and not very accessible, thinly peopled with scattered settlements on coastal creeks and bays, and economically backward and stagnant. The people live mainly by small-scale agriculture, wood-cutting, turtle- and sponge-fishing, and by such cottage industries as straw manufactures. It is worth noting in passing that the collecting of sponges, which grow on the shallow banks around the islands, has declined of recent years as a result of a fungoid disease which has attacked the sponge beds. The industry which once employed several thousand men has now virtually disappeared.

Apart from tourism, the chief economic pursuits are tomato and pineapple growing (which support four canning plants), lumbering, fishing, and salt raking. Small quantities of lumber, salt, crawfish, and tomatoes are exported; their total value is only about £1½ million. Imports total about £15 million annually. The deficit is made good by the income from the tourist trade.

Chapter VII

NORTHERN SOUTH AMERICA

COLOMBIA

COLOMBIA in the north-west is one of the five South American countries which are largely dominated by the Andean Highlands. It is unique in being the only South American republic bordering two oceans: it possesses a 1000-mile stretch on the Caribbean which gives it access to the Atlantic and another 1000-mile stretch along the Pacific. Roughly square, or rather rhomboidal, in shape, it has an area of about 495,519 square miles—roughly twice the size of France—which makes it fifth in size among the states of South America. In point of fact, however, only one-third of the entire area is effective national territory, for the eastern two-thirds, though nominally Colombian, are hot, wet lowlands little known and sparsely peopled. It is estimated that less than 2% of Colombia's 18 million people dwell in this interior lowland region. For all intents and purposes the Andean highland zone in the west, together with the Caribbean coastal lowlands, is the only part of Colombia that presently matters.

Few countries can show such diversity of physical background and such striking physical contrasts: tropical forest, barren desert, temperate valleys, wind-swept plateaus, steaming lowlands, and snow-capped mountains all occur within the republic. This medley of differing environmental conditions is scarcely paralleled anywhere else in the world. These wide differences result from two basic physical factors, a highly irregular relief pattern and a position near to the equator. This conjunction of relief and position gives rise to a vertical zonation of climate such as has been noted in other countries, but which is conspicuously well marked in Colombia. The diversity of climatic conditions results in variety of vegetation type and agricultural crops.

The varied regional conditions, the nature of the population distribution, the historical development, the variety of economic production, and the problem of communications cannot properly be appreciated without some knowledge of Colombia's physical background; hence it will be advisable to commence this study of Colombia with a brief account of its physique.

STRUCTURE AND RELIEF

Physiographically the country may be divided into two major clearly-cut sections: (i) the north-western portion, consisting of mountain ranges, inter-montane valleys, and coastal lowlands; and (ii) the extensive plains or *llanos* occupying the somewhat larger south-eastern part.

In the first section, conveniently called the Andean province, there is a

roughly longitudinal pattern of relief features related to the main structure lines. Three Andean ranges of great structural and geological complexity dominate the section. These mountains are very rugged: not only are they high—each range includes peaks, sometimes snow-topped, which attain heights of 15,000–19,000 ft—but they are deeply dissected by gorges, often plunging to depths of several thousand feet, which separate narrow divides. The mountain sides are commonly steeply sloping with angles of 25–60 degrees.

North and west of the mountainous core are extensive coastal lowlands, more particularly well developed along the Caribbean, which are crossed by several rivers and in places are very swampy. These coastal lowlands are built up in the main of marine Tertiary strata. Great thicknesses of sandstones, shales, and limestones occur.

Beyond the Andes, the south-eastern section comprises a vast low plain drained by several headstreams of the Amazon and Orinoco.

PHYSICAL REGIONS

At first glance the relief map suggests a somewhat bewildering complexity of topography, but a careful study reveals a succession of physical regions which can be correlated with the main structural features. Colombia belongs to the Cordilleran highlands in the west and to the Amazon and Orinoco lowlands to the east. In the Cordilleran section three main ranges, which diverge from the Pasto knot near the southern frontier, traverse the country. In addition to these roughly parallel north-south ranges, there is a fourth which hugs the Pacific coast and is unrelated to the Cordilleras proper. These mountain spines, separated by river valleys, provide the physical framework of the country. There is a general north-south alignment of the relief features. Altogether ten physical regions can be distinguished.

(1) *The Pacific Coast Range.* This coastal range flanking the Pacific is in effect a prolongation of the mountain backbone of the isthmian region. It continues southwards, running parallel with the coast, as far as the Bay del Choco, roughly the mid-point of Colombia's Pacific coast. The Coast Range is not very high, nowhere exceeding 6000 ft. As a result of the warm, humid conditions the slopes are completely forested and the mountains are virtually uninhabited.

(2) *The Atrato-San Juan Depression.* The Pacific Coast Range is separated from the Cordilleran system proper by the Río San Juan and the Atrato. The depression occupied by these two rivers stretches from the Gulf of Uraba, itself part of the depression, to the Pacific at Buenaventura, whence it is continued southwards as the narrow coastal plain bordering the Pacific. This, too, is a region of light settlement.

(3) *The Cordillera Occidental.* The westernmost prong of the Northern Andean fork, consisting of crystalline rocks, is the lowest of the three Cordilleran ranges and does not generally exceed 10,000 ft in height. It

is not sufficiently high to reach the snow-line. Several passes lying at elevations between 3000 and 6000 ft make the Cauca valley immediately to the east accessible from the Pacific. About 7 degrees N. the Western Cordillera branches to form two prongs between which flows the Sinu River.

(4) *The Cauca Rift Valley.* The narrow rift valley of the Río Cauca is drained northwards by the Cauca and southwards by the Río Patre. The divide between the two rivers lies some 8000 ft above sea-level, while the valley floors are at an elevation of about 2500 ft. Between the towns of Cali and Carceres, 250 miles downstream and at the head of navigation on the Cauca, the river flows through a deep canyon-like valley and is broken by numerous rapids. Eventually the Cauca joins the Magdalena River.

(5) *The Cordillera Central.* The central prong of the Cordillera runs as a mighty mountain range for a distance of about 500 miles and is some 30-40 miles in width. This great complex massif of crystalline rocks, crowned by snow-capped volcanic peaks, reaching an elevation of 18,000 ft, forms a major divide and obstacle. Its effectiveness as a barrier has been lessened by the building of a road in the early 'thirties through the Quindío Pass (10,000 ft) and other road crossings.

(6) *The Magdalena Valley.* The valley of the Río Magdalena, though wider than the Cauca, is narrow in its upper part, but north of La Dorada it widens out considerably to merge into the Caribbean lowlands. In its middle section, where it occupies a broad fault trough some 50 miles wide, widespread swampy tracts occur and the alluvial plain is largely uninhabited. The upper part of the Magdalena valley tends to suffer from drought. The river is navigable to La Dorada some 592 miles upstream.

(7) *The Cordillera Oriental.* This easternmost range of highly folded and faulted mountains splays out from the Cordillera Central 2 degrees N. of the equator. At its northern extremity it divides into two branches which sweep round to enclose Lake Maracaibo. The westernmost branch forms the Peninsula of Guajira, the eastern the Sierra de Perijá. The Eastern Cordillera contains high plateaus with several basins ringed round with hills. The mountain slopes are often highly dissected.

(8) *The Sierra Nevada de Santa Marta.* These mountains, cut off from the Sierra de Perijá or western prong of the Cordillera Oriental, by a depression, form an isolated triangular-shaped mass which towers up to heights of almost 19,000 ft. Geologically it is a batholith surrounded by a collar of metamorphic rocks.

(9) *The Caribbean Lowlands.* North and east of the mountains of the Cordilleran system lie the Caribbean plains of Colombia. This broad tropical plain of the northern coast is in large part the estuarine delta of the Magdalena. The lowlands share in some measure the features characterising the middle Magdalena valley; they form an ill-drained area with many shallow lakes, much swamp land, and large tracts of thick tropical forest.

(10) *The Eastern Lowlands.* Beyond the Cordillera Oriental extensive unbroken piedmont plains, 600-1200 ft high except on the flanks of the Andes, stretch eastwards for some 600 miles. These hot, wet lowlands,

seamed by numerous eastward-flowing streams, form part of the basins of the Orinoco and Amazon. The region covers approximately 300,000 square miles or about two-thirds of Colombia. It is an area of mixed scrub and savanna in the north and tropical rain-forest in the south.

LAND USE AND CROPS

The wide diversity of altitude, surface, soil, and climate explains the many variations in the utilisation of the land. Land use in Colombia is as follows:

| | % |
|---|----|
| Cultivated land, arable and orchard . . . | 2 |
| Permanent meadow and pasture . . . | 23 |
| Forest and woodland . . . | 63 |
| Waste land and built up areas . . . | 12 |

Although only a very small fraction of the total area is given over to the growing of crops, some two-thirds of the active population are engaged in agriculture. Colombia has an extremely varied agricultural economy, but coffee cultivation and cattle-ranching are the most important aspects of the country's agriculture, and give employment to large numbers, approximately 50%, of the population.

Of those engaged in agriculture approximately 25% own their farms, 25% rent land, and the rest are wage-earners. Half of the farms hardly pay. Apart from the Antioquenos, *i.e.* the people of the department of Antioquia, the average countryman works by force of habit and works very slowly. On the large estates conditions are frequently reminiscent of feudalism. 40% of the receipts of taxation come from taxes on land.

Of the 5½ million acres which are cultivated, the bulk lies in the valleys, bench-like plateaus, and intermont basins of the Andean Highlands. Some 880,000 acres, it is estimated, are devoted to coffee plantations. These *fincas* are found lying mainly between 3000 and 4000 ft. Coffee is the most important crop of the sub-tropical zone, but maize, sugar, and tobacco are also cultivated. In the more humid parts of the tropical lowlands bananas and cacao, sugar-cane and cotton are grown. In the cool temperate regions of the higher areas wheat and other grains, potatoes, beans, and other vegetables are raised. Along with these, which are the principal crops, may be added many others, such as rice, coconuts, rubber, yucca, tagua nuts, oil seeds, plantains, oranges, sisal, and hemp.

Coffee, which is the sheet-anchor of the Colombian economy, was relatively late in coming to Colombia, and did not become a significant item in the export trade until after 1880. Colombia, which is the world's second largest producer, exports about 6 million bags of coffee a year, which represents approximately one-eighth of total world output. Coffee exports represent some 70% by value of all Colombian exports. Colombia specialises in the production of a mild variety, *café suave*, which resembles the Central American rather than the Brazilian type and is much used for blending with other coffees.

After coffee, cotton and bananas are the chief export crops. Cotton

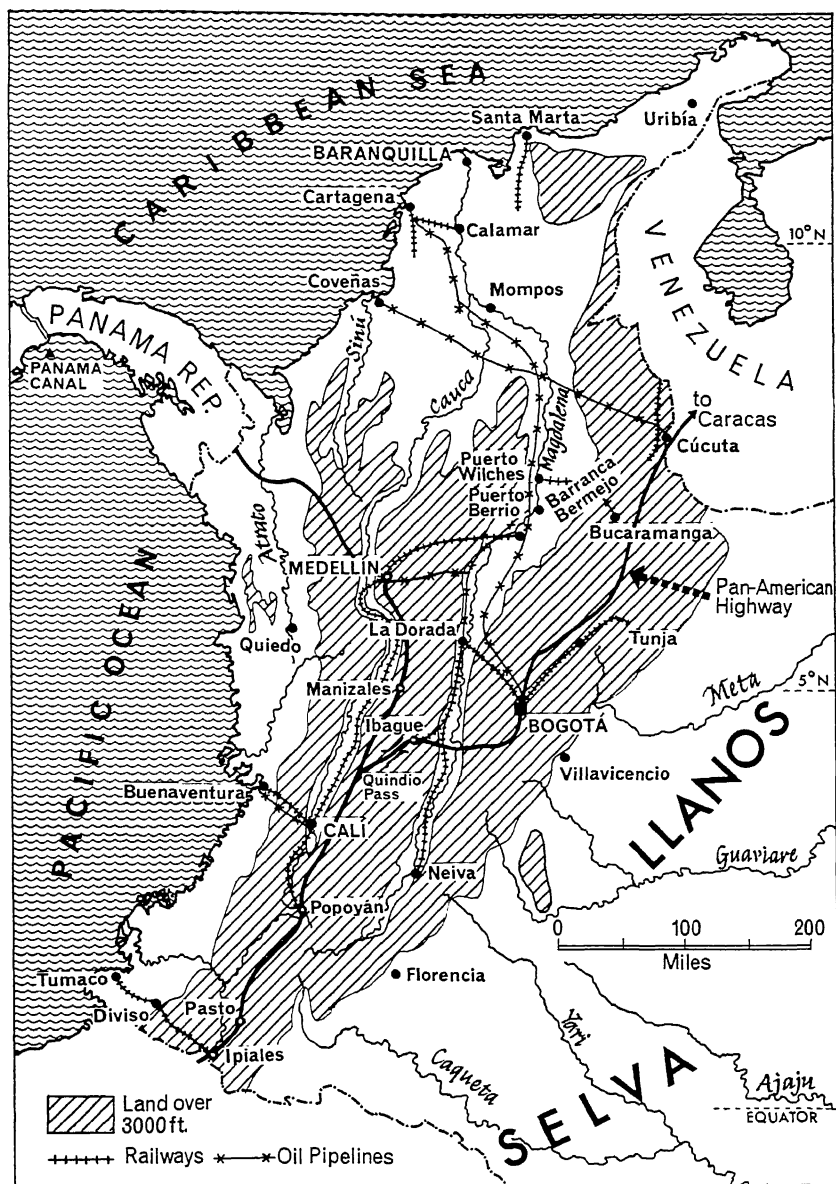


FIG. 61.—Colombia: general features.

has grown in importance and now ranks before bananas. Colombia exports about 10 million stems annually. This represents a wonderful comeback since, as a result of the loss of markets during the Second World War and the ravages of the sigatoka fungus, exports had dwindled to nothing in 1943. Bananas account for about 3% by value of Colombia's exports.

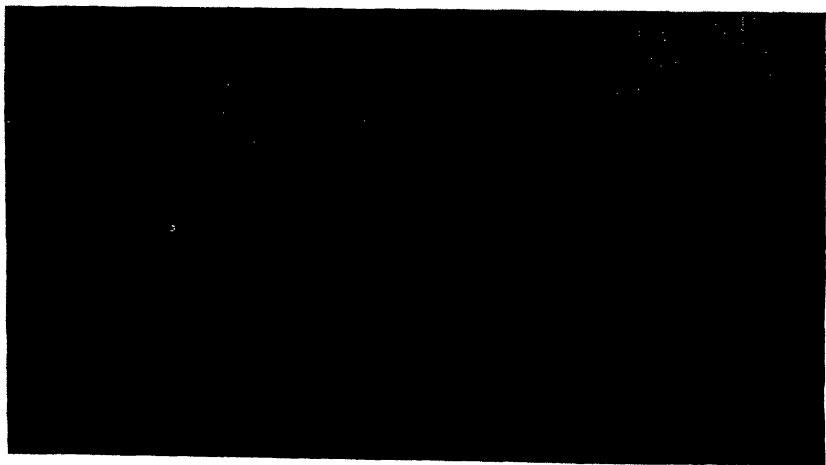
Coffee, cotton and bananas apart, Colombia's exports of other crops are

very small. Sugar production is just about sufficient to supply home needs. In rice, too, Colombia is practically self-supporting. Cocoa is a staple of Colombian diet, yet it is little cultivated, and output is scarcely sufficient to satisfy the home demand. While the country is self-sufficient with regard to most cereals, there is inadequate production of wheat. The land which can be given over to wheat cultivation is restricted; moreover, Colombian wheat, which is soft, requires an admixture of harder, foreign grain. There is every indication that the level of wheat imports will remain fairly high.

Since almost a quarter of Colombia comprises natural grazing land, it is scarcely surprising that the livestock industry assumes much importance. There are rich cattle-grazing lands in the Caribbean coastal plains, in the valleys of the Magdalena, Cauca, and Sinu, and in the *llanos* of the eastern lowlands. The last region is, however, sorely handicapped as a consequence of its poor communications. Colombia has some 15 million head of cattle. The cattle-rearing industry is now receiving considerable attention; European and East Indian stock are being imported for crossing with native breeds, while improvements to the natural pasture are being made. Sheep, goats, horses, and mules are also reared in considerable numbers in the highlands. In addition, there are over 2 million pigs.

MINERAL WEALTH

Colombia is known to possess considerable stores of mineral wealth, but the scarcity of outcrops, the scattered occurrence, the ruggedness of the terrain, and their high transportation costs are factors militating strongly against mining. The chief mineral commodities produced in Colombia fall into three groups: (i) the precious metals, gold, silver, and platinum,



[Courtesy: C. and M. Haywood.]

FIG. 62.—Gold has been mined and dredged in the streams of Colombia since the Spanish Conquest. Colombia is the largest producer of gold in South America.

and emeralds, which are mainly for export; (ii) coal, limestone, gypsum, salt, iron, etc., which are needed for the domestic market; and (iii) petroleum, which is produced in fairly large quantities, principally for export.

During Spanish colonial times Colombia was one of the principal gold-producing regions of the world. Output during the present century has vacillated considerably; currently, it is small, and amounted in 1961 to

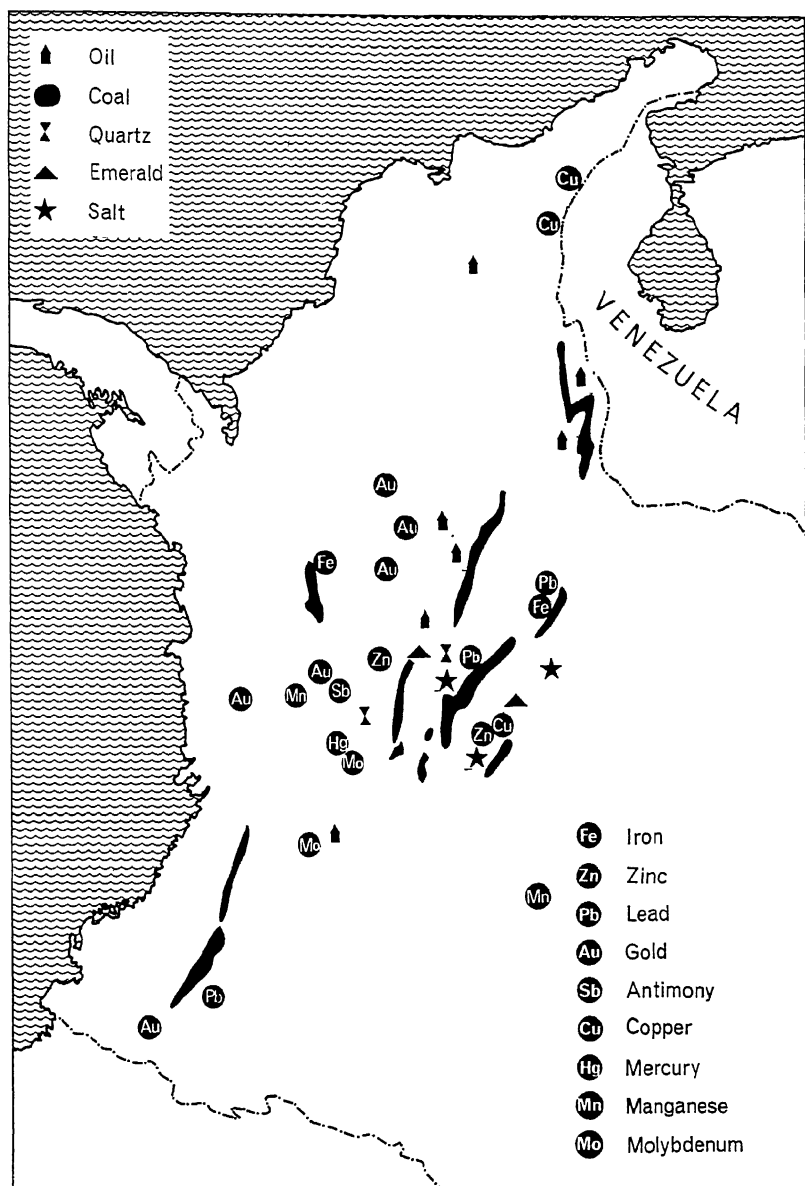


FIG. 63.—Colombia: mineral resources.

399,877 oz. Though gold exists in quartz lodes in the Western and Central Cordillera, most of the gold comes from the auriferous gravels of the Río Cauca and the streams of the *intendencia* of Choco. Colombia ranks first among the gold-producing countries of South America, yet it accounts for only about 2% of total world output. Silver is also mined, but, like gold, has shown a tendency to decline. The third of the precious metals, platinum, which frequently occurs with gold, is mined in smaller quantities than formerly, production falling from 54,900 oz. in 1934 to 20,232 oz. in 1961. Platinum is obtained from the gravels of the upper Atrato and San Juan rivers and the Río Patia in the southern part of the Pacific coastlands. Colombia is the world's most important, and, indeed, apart from the Soviet Union, only source of emeralds. There are only two mines, the Chivor mine and the Muzo mine, near the capital.

Coal is found in various parts of the country, and fairly substantial deposits would appear to exist, but so far they have been little exploited, and total production amounts to $2\frac{1}{2}$ million tons a year. The difficult location of the coal deposits has militated against their exploitation. The richest deposits and the bulk of the production occurs in the Cali district. Iron ores are frequently found in close proximity to coal deposits, but production is small. Colombia has considerable water-power resources, and the development of hydro-electricity during recent years has provided an impetus to industrial development.

Of all Colombia's mineral resources, petroleum is by far the most important, although it must be admitted that the great expectations of a quarter of a century or so ago have never materialised. Production, which began in 1919, was 21 million barrels in 1938, 25 million in 1947, 40 million in 1955, and 52 million in 1962. Of this recent output three-quarters was exported. Oil occurs fairly widely in Colombia, and there are over two dozen fields, but production comes from three main areas: from the middle Magdalena valley around Barranca Bermeja, which is the principal producing region at the present time; from the Catatumbo River region along the eastern frontier not far north of the town of Cúcuta; and from the lower Magdalena valley in the province of Magdalena. Many of the older fields in Colombia have passed their peak of production, and one field, Petrolea South, discovered in 1937, has been considered to be depleted and abandoned. The search for new sources has been intensified during the past few years. At the present time Colombia ranks as the third producer in Latin America. Most of the oil in Colombia has been exploited by foreign companies, and the United States and Great Britain have contributed 85 and 15%, respectively, of the foreign investment.

INDUSTRIAL DEVELOPMENT

Of all the Andean countries, with the exception of Chile, Colombia has advanced farthest as a manufacturing country. The effects of two world wars, the desire for a greater measure of economic independence, and the incentive of larger rewards than agriculture can promise have all acted as

spurs to the development of industry. The past twenty years have witnessed extraordinary industrial advancement and if the present tempo of development is maintained industrialisation promises to alter considerably the face of the country within the next twenty years.

What advantages has Colombia for industrial development? In the first place, she is fortunate in possessing a wide range of industrial raw materials, *e.g.* metals, timber, animal and vegetable fibres, plant crops, etc. Secondly, she possesses sufficient fuel and power supplies—coal, oil, and hydro-electricity—for her industrial requirements. Thirdly, with a population of some 14½ millions, Colombia has an internal domestic market sufficiently large to support a fairly wide range of consumer-goods industries. Fourthly, with her rapidly growing population and growing shortage of good arable land in the highlands, she has an abundance of cheap, and in the near future probably of surplus, labour. And finally, Colombian laws permit the free export of capital and profits, a condition which is an incentive to foreign investment: indeed, Colombia “is considered one of the healthiest climates for foreign currency.”

Against these advantages must be measured a number of disadvantages, *e.g.* the isolated and relatively inaccessible location of many of the main urban centres, the relatively poor communications and facilities for distribution, and the lack of trained and skilled workers and scientific and technical know-how.

Industrialisation in Colombia began with the investment of both local and foreign capital. It concerned itself initially with food processing, consumer-goods industries, and the oil industry. Diversification gradually developed, introducing such industries as chemical, glass, leather, timber, and cement industries. Until recent years heavy industry was at a discount, but since the latter part of 1954 Colombia has been producing steel.

Of the various branches of industry, food-processing still ranks first; into this category fall flour-milling, coffee preparation, sugar-refining, brewing and distilling, and meat packing. Textiles come second in importance. Cotton and woollen factories are numerous. There are about a score of cotton-spinning and weaving factories, located mainly in Medellín, Bogotá, Cali, Manizales, Samaca, and Barranquilla. Rayon manufacturing has been introduced, and there are factories in Medellín and Barranquilla. Fine speciality cloths excepted, Colombia is now virtually self-sufficient in textiles and is even able to export some cotton cloth. Developments in the chemical and associated industries have proceeded steadily. There are some three dozen chemical factories producing drugs, pharmaceuticals, toilet preparations, and plastic goods. Colombia has four oil refineries, at Barranca Bermeja, Cartagena, Tibu, and Guamo, but only the first is a large one.

The Industrial Development Institute (*Instituto de Fomento Industrial*) has played an important role in the country's industrial expansion. The current policy of the Institute, and one that it has followed during the past ten years, is one of concentrating upon a few main projects which are

considered to be vital for Colombia's industrialisation but which are beyond the scope of private resources. Mention might be made of one or two of the Institute's projects. The new Paz del Río integrated blast-furnace and steel mill, located about 150 miles north of Bogotá, is an offspring of the Institute's planning. It is very conveniently placed with respect to its raw-material requirements of iron ore, coal, and limestone, which are near at hand in ample supply. Another of the Institute's projects is the Betania soda plant, which is based upon the salt deposits of Zipaquirá, estimated at 1000 million tons. Yet another is the project for making fertiliser based on the sulphur deposits at Purace near Popayán and the phosphoric rock of the Pacific island of Malpelo. Smaller undertakings originated by the Institute include a vegetable-oil plant at Barbosa, a rope and packing-materials factory at San Gil, a rubber tyre factory at Icollantas, and a mangrove-extract factory at Buenaventura.

While many towns possess factories, industrial cities such as are characteristic of Western Europe scarcely exist, if they may be said to exist at all. But the skyscraper city of Medellín, the traditional manufacturing centre of Colombia, is an industrial metropolis. Today, industrialism is booming and many other cities are quickly becoming important centres of manufacture. Three towns in particular, Bogotá, Cali, and Barranquilla, have shown spectacular growth and bid fair to challenge Medellín's hitherto unrivalled leadership.

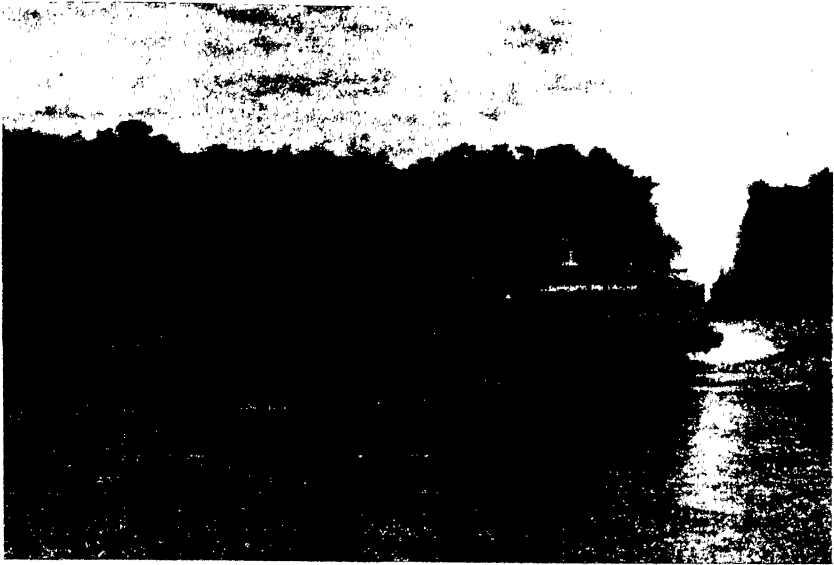
TRANSPORT AND COMMUNICATIONS

"The achievement of greater production," wrote L. A. Scopes,* "is always in danger of neutralisation by Colombia's ancient enemy—the problem of transportation." Lack of adequate communications has seriously handicapped the republic in the past, forming an obstacle not merely to economic progress but also to political unity and social improvements. The problem of transport and communications has been surmounted to some degree by railway construction. More recently the development of motor transport has done a great deal to open up the country, and highways tap a much wider area than do the railways. But it is undoubtedly the aeroplane which has done most for Colombia from the point of view of inter-regional linkages and general accessibility.

The topography with its corrugated pattern presents serious difficulties for both road and rail communication. But apart from the obvious problems posed by relief in so mountainous a country, Colombia is, geologically speaking, a new land and "the great Andean masses are still engaged in the process of settling down, not only in the more spectacular form of earthquakes, but also in the perpetual minor landslides which, especially in the periods of tropical rainfall, are continually blocking or carrying away roads and railways."† Hence the maintenance, as well as the construction, of highways is extremely difficult.

* SCOPES, L. A. *Colombia*. Overseas Economic Survey. H.M.S.O. 1950.

† SCOPES, *op. cit.*, p. 26.



[Courtesy: C. and M. Haywood.]

FIG. 64.—Shallow draught stern-wheelers can often be seen pushing barges. During low-water periods river craft may be grounded on sandbanks for days at a time. Note the thick forest growth lining the Magdalena.

The early history of transport in Colombia was essentially that of navigation by water. The Río Magdalena provided *the* natural line of communication in Colombia. It has long served as the life-line of the country, linking the highland heart with the Caribbean coast and the world beyond. From the various river ports—Gamarra, Puerto Wilches, Puerto Berrio, La Dorada, and Honda—roads, railways, and aerial cables have been constructed to provide links with main settlements in the highlands. The Magdalena, however, is not an easily navigable river: near its mouth is a sand-bar, progressive silting is taking place, and rapids at Honda interrupt navigation. Upstream, the river is navigable by shallow-draught vessels as far as Neiva. The trip from the coast to the capital requires three to five days in a river boat and another day by road or rail. La Dorada, which is the terminus of river transportation, is connected to Bogotá by a railway. The Río Cauca is navigable as far as Caceres, approximately 200 miles upstream from its confluence with the Magdalena. The Atrato and Sinu rivers are also navigable for considerable stretches.

The construction of a national network of railways was planned, but it is extremely doubtful whether the network originally envisaged will ever materialise, since a number of factors tend to militate against the project. The most important of these factors are: the costliness of constructing and maintaining railways in Colombia; the difficulty of securing capital to finance the proposed extensions; the increasing competition from road and air transport; and the uncertainty of whether the potential volume of

traffic will justify the outlay. In view of these factors it seems likely that the programme of railway expansion will be pruned. There is another point, too, which requires consideration. Railway construction is a slow business—especially so in Colombia, where topographical difficulties are so acute—and the projected railway plan, according to experts, would require fifty years for its completion. It would, of necessity, be a long-term project, but Colombia can ill afford to wait half a century for an efficient communications system. Thus, from this viewpoint also, the original plan for a national network is likely to be cut. In truth, roads rather than railways are likely to provide the answer to Colombia's communications problem.

At the present time there are two main railway lines in Colombia. The first runs from Puerto Berrio westwards to Medellín and then proceeds up the Cauca valley to Cali, whence an extension runs to Popayán. From Cali an important branch line runs to Buenaventura on the Pacific. The construction of this railway, and the motor highway which also links the two cities, has led to much of the trade of the Cauca valley moving out via Buenaventura instead of down the Magdalena as it did formerly. The second main line runs up the upper Magdalena from La Dorada to Neiva with two lines branching off leading to Bogotá. From the capital the railway continues north-eastwards to Tunja and beyond as far as Paz del Río. Besides these two main lines, a number of short stretches of railway occur in various parts of the country; usually they penetrate inland from coastal points, *e.g.* from Santa Marta to Fundación, Cartagena to Calamar on the Magdalena, Tumaco to the gold-mining area around Diviso. Under construction is a line from Fundación to La Dorada along the Magdalena valley; this will link up with the existing system of the upper Magdalena. At the present time there are 2200 miles of railway.

In 1963 there were 15,000 miles of metalled road. Except in the vicinity of Bogotá and Medellín, good roads were scarce until very recent times. Since the war many new highways have been built and many of the old "dirt" roads, which were passable by motor traffic in the dry season only, have been surfaced. There are two main trunk roads in existence: the Western Trunk Highway, which runs from Turbo on the Gulf of Uraba to Medellín and thence to Cali, Popayán, Pasto, and Ipiales near the Ecuadorean frontier; and the Eastern Trunk Highway, which runs from Cúcuta, near the Venezuelan border, via Bucaramanga to Bogotá and thence to Girardot on the upper Magdalena. In 1955 a new road was built between Cartagena and Medellín. The Quindío Pass (10,800 ft), between Armenia and Ibagué, which hitherto formed a major obstacle to east-west communication, has now been crossed by a road and provides a vital link between the Magdalena and Cauca valleys. A new 236-mile highway linking La Dorada and Capulco will help the development of the Magdalena valley.

Because of the natural difficulties confronting all forms of surface transport, air communications were obviously destined to have a striking de-

velopment and to play a leading part in Colombia. The Scadta Company has played a major role in the development of Colombia's air transport services. Sea-planes land on the river, and aircraft have to land and take off at high altitudes, in either case difficult manoeuvres, but expert pilots have ensured that flying is accident free, hence there is little or no prejudice against it. Since air transport began in 1920, the aeroplane has had a unique role in Colombian transport and communications. Much cargo, which elsewhere would be moved overland, is carried by aircraft. An interesting item of Colombia's export trade which is dependent upon air transport is the export of orchids, which are flown daily to the United States. In few countries is air traffic of such importance, and in few countries are air services so regular and the air net so widely spread. The availability and effectiveness of air transport has without question hindered the development of adequate land communications.

TRADE AND TRADE OUTLETS

Coffee, long the mainstay of the economy, is still the dominant export item. Coffee generally accounts for 72% by value of the country's exports. Crude oil is the second most important item (15%). Bananas rank third (3%). Small quantities of timber, tobacco, hides, and platinum are exported. In some years there is a small export of sugar.

For many decades the United States has been Colombia's chief customer and at the present time she still takes over 70% of Colombia's exports. Since the Second World War there has been a re-orientation of trade so far as Colombia's other customers are concerned; whereas before the war most of the remainder of her exports went to Canada, Germany, and France, now she sells her goods to Venezuela and Ecuador. This reflects the development of Colombian export trade towards her Latin American neighbours.

Imports consist mainly of metal goods, machinery, chemicals, and yarn. Textiles have gradually declined as Colombia's own textile industry has developed. Most of the imports come from the United States, the United Kingdom, and Canada. The United States accounts for about 60% of the import trade. Britain might well seek a larger share of Colombia's trade.

The export and import trade is carried on principally through Colombia's Caribbean ports, *i.e.* Barranquilla, Cartagena, and Santa Marta. During the post-war period, consequent upon improved road and rail transport, the capital and the upper Magdalena valley have begun to use the Pacific outlet of Buenaventura. As a result, Buenaventura rivals Barranquilla as Colombia's chief port. Already 75% of Colombia's coffee exports move through Buenaventura. The new Magdalena railway being built between Fundación and La Dorada promises to divert some of the trade which now passes through Barranquilla to Santa Marta.

COLOMBIA: REGIONS (Fig. 65)**THE ANDEAN HIGHLANDS**

The interior highlands, especially the plateaus, mountain basins, and high valleys, form the core region of Colombia. Throughout historical times this highland region has been the settled part of the country, and to this day the highlands remain the focus of political and economic power. In pre-Columbian times the Cordilleran region was the seat of Indian settlement and civilisation, although the Chibchas were backward in comparison with the Incas of Peru. When the Spaniards came to South America they were attracted to the interior highlands, since here was the gold they sought, here was a better climate than on the lowlands, and here was a potential labour force. Bogotá, the present capital, was founded as early as 1538. At the present time approximately 80% of Colombia's population dwell in the highlands and Colombia's three largest cities, Bogotá, Medellín, and Cali, are located here. The various settlement in the highlands are not only isolated from the coasts but are also isolated from each other as a result of the topography.

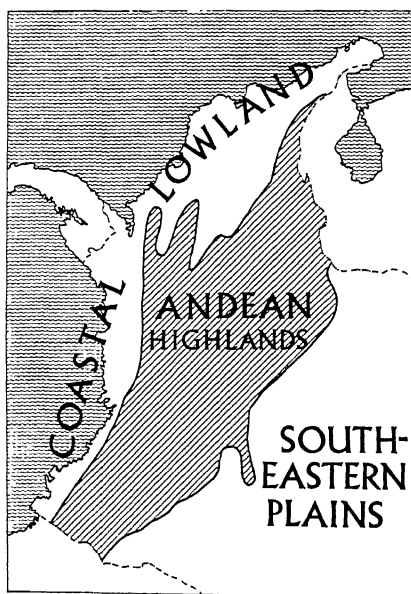


FIG. 65.—Colombia: regions.

The first Spanish settlers occupied parts of the present province of Antioquia. Mineral wealth was the initial attraction, but they soon turned to agriculture, which became the economic mainstay of the settlers, as it has continued to be. Here in Antioquia "there arose in semi-isolation a peculiarly energetic and cohesive cultural group" which "with

their aggressive colonising genius and high birth-rate, are today the dominant and most clearly defined population element in Colombia.”* Medellín (775,000), which lies at 5100 ft, became the chief town of the area and is now an important banking, commercial, and industrial centre; its varied manufactures include textiles (it is known as the Manchester of Colombia), tobacco, glassware, pottery, matches, and confectionery. The pioneers who lived in this core region of Antioquia began, during the nineteenth century, to colonise the steep but fertile volcanic slopelands



[Courtesy: C. and M. Haywood.

FIG. 66.—Hauling logs, Colombia.

to the south in the provinces of Caldas and Tolima and developed them as coffee lands. The town of Manizales (222,000), situated right in the midst of the coffee country, is an important centre for the coffee trade. Cali (693,000), lying 3300 ft above sea-level and advantageously sited in the upper Cauca Valley just over 100 miles east of the Pacific port of Buenaventura, is the chief commercial city of western Colombia. It owes its very rapid recent growth partly to its extremely pleasant temperate climate. Cali lies in one of the richest agricultural areas of the country, producing coffee, sugar, and cotton. About 100 miles farther south, on the motor road to Quito, lies Popayán (56,000), founded in 1536, an aristocratic residential town with fine monasteries, churches, and buildings, rich in Catholic relics.

Notwithstanding the Magdalena's importance as a highway, the valley

* PARSONS, JAMES J. "Colombia." *Focus*, vol. VII, March 1957.



[Courtesy: C. and M. Haywood.]

FIG. 67.—This street is in the old part of Bogotá. Note its steepness; also the tiled dwellings suggestive of Spain. In the distance can be seen the mountains surrounding the Cundinamarca basin.

is thinly peopled. The upper part of the valley is narrow and has a tendency to be dry. There is an absence of towns: the most important centre is Neiva (68,000), the terminus of the railway. The borderlands of the Magdalena, *i.e.* the mountain benches and tributary valleys, are much more densely settled.

One of the most important, if not *the* most important, basins of the highlands is that of Cundinamarca. The Spaniards early appreciated the value of this upland basin with its fertile soil and temperate climate and quickly developed it as a crop-growing area. The land was divided up into large estates, which were worked by impressed Indian labour. The economy in this, as in all the other upland basins, is based on agriculture, usually the cultivation of maize, wheat, barley, quinoa, potatoes, and beans. In some parts coffee is grown for export. Bogotá (1,329,000) is located on the edge of the Cundinamarca basin at an elevation of 8700 ft. Though possessing a somewhat isolated situation, Bogotá has become the great focus of Colombian life, functioning not merely as a governmental centre but also as the intellectual, cultural, and artistic centre. The capital, in addition to a wonderful setting amidst majestic mountains, is one of the most beautiful cities in South America. It is, however, not very favourably placed as regards industrial or commercial activity on account of its high altitude and remoteness from the sea. On the other hand, as capital it has become the hub of Colombia's air routes, and air transport has made it readily accessible. During recent times Bogotá has witnessed a very rapid growth, and the centre of the city has been completely modernised.

Tunja (47,000), over 100 miles north-east of Bogotá, is the centre of another mountain basin. The town is one of the oldest cities in America. Bucaramanga (221,000), about 150 miles north of Tunja, is the focus of another basin. Standing just over 3000 ft above sea-level, it is the centre of a rich coffee- and tobacco-growing district.

Economic conditions, of course, vary widely between locality and locality in the highlands. Some areas have a prosperous agriculture, others are very poor; some districts specialise on cash crops, others depend upon subsistence farming; some areas are under large estates, whereas in others a primitive shifting agriculture prevails. Antioqueno agriculture, though depending principally upon coffee cultivation, especially the production of fine-quality suave coffee, has a fairly diversified agriculture; moreover, most of the land is in small-holdings: these "family-size farms produce more than three-fourths of Colombia's coffee crop." On the other hand, in many parts of the Cordillera Oriental extreme rural poverty prevails; tenant farmers practise a subsistence economy, growing cereals and vegetables, under an oppressive system inherited from colonial times.

LIFE IN THE LOWLANDS

Along the west and north-west coasts, up the lower Magdalena, Cauca, and Atrato valleys, and on the eastern plains, the climatic conditions are essentially tropical. High temperatures are characteristic throughout, but

the amount of rainfall varies. Along the Pacific coast and in the middle Magdalena valley where monsoonal influences occur, the precipitation is heavy, often amounting to over 150 in. But on the Caribbean coastlands and on the lower Magdalena Plains the rainfall is much less, in places under 40 in., an amount which, under tropical temperature conditions, is on the short side.

On the Pacific coastal lowlands and in the valley of the Río Atrato, where high temperatures, heavy rainfall, and dense forest prevail, settlement is sparse and widely scattered. Very little development has taken place. Organised agriculture is virtually non-existent. The population, 85% of whom are of negroid descent, mostly live by subsistence farming growing maize, manioc, and plantains which form the basic food crops. The commercial production of bananas and rice is of growing importance, although the output still remains small. It is interesting to note that some medicinal plants and some vegetables are cultivated on soil-covered platforms which are raised some 5-10 ft above the ground; this is done to overcome the excessive dampness which otherwise would ruin the crops and to avoid the ravages of ants. The inhabitants also usually collect forest products, such as wild rubber, balata, tagua nuts, chicle, and toquilla fibre. Some of the people work as miners, for gold and platinum occur in the alluvial deposits of the Atrato Valley and along the Pacific coast. Settlement congregates in isolated clusters. The chief inland settlement is Quibco in the upper Atrato Valley. On the Pacific coast is the growing port of Buenaventura (50,000), one of the few ports of this coast capable of accommodating ocean-going vessels. Buenaventura is the terminus of the railway which crosses the Western Corillera to Cali and the Cauca valley. It is also linked by motor highways to Bogotá and to Quito in Ecuador.

The Magdalena Plain, which from the map one might expect to be a thickly populated, richly productive region, is a much under-developed lowland. These lowlands have been largely eschewed by Europeans and Indians, and the bulk of the population are Negroes. Some 17% of Colombia's population occupy the Caribbean lowlands. These level plains are, as we have already indicated, comparatively dry though hot. Considerable areas are under scrub and grassland and offer good cattle-raising country. It is, therefore, hardly surprising that these plains have been traditionally concerned with livestock rearing. The industry has been improved by careful stock-breeding and better feeding. The natural pastures have been upgraded by the planting of Para or guinea grass. Cattle are reared for meat, milk, and draught purposes. Sugar-cane and cotton are grown on a commercial scale in the region of the lower Magdalena, but the total production is small in the case of both crops. Banana growing is carried on in the Santa Marta district, especially on the lower slopes of the mountains behind the town of Fundación. Commercial farming is also gradually expanding in the Sinu valley.

The occurrence of petroleum on the Magdalena Plain may do much to

open up this rather neglected region. The potential resources of oil appear to be great and production is rapidly increasing. A pipeline runs from the oilfield to Cartagena. Cartagena, along with Barranquilla and Santa Marta, are the chief centres. All are ports. Barranquilla (500,000), 11 miles up the Magdalena, is the chief port of Colombia. Long handicapped as a port by silting, it has now been deeply dredged and is accessible to ocean-going vessels. As a result, the deep-water port of Puerto Colombia, which served as Barranquilla's outport, has become more or less superfluous and is no longer in use as an ocean port. Barranquilla is the chief outlet and clearing point for the Magdalena valley. It has a variety of miscellaneous manufactures. The old city of Cartagena (245,000), founded in 1533, its harbour entrance still protected by ancient forts, is now chiefly noteworthy as an important oil pipeline terminus. The old city, however, which is built on an island—Tierra Bomba—linked to the mainland by several bridges, is full of interest: it has remarkable old walls, many colonial churches, the Palace of the Inquisition, narrow streets with balconied houses, and arcaded plazas.

THE SOUTH-EASTERN INTERIOR PLAINS

The extensive plains beyond the Cordillera Oriental, comprising over $\frac{1}{2}$ million square miles and accounting for some three-fifths of the area of Colombia, play little part in the country's economy. This vast little-known region of savanna and selva is inhabited by only a minute fraction, 1.3%, of the total population, chiefly by small groups of aboriginal Indians and scattered colonists. The density is estimated at 0.56 to the square mile, which makes the region one of the least populated areas in Latin America.

Near the foot of the Cordillera Oriental the savanna plains are used for ranching, and the immigrant colonists are mainly concerned with stock-raising. The rough grasslands of the *llanos* are quite well suited to cattle and there has been a rapid development of ranching. A point of interest is that many of the cattle are driven on foot over the mountains to Bogotá, suffering as a consequence much loss of weight, and the animals, when *en route*, are provided with sandals to protect their feet. The cattle have to be moved in the live state owing to the rapid putrefaction of flesh in tropical climates. However, cattle are now being slaughtered at Villavicencio, a foothill town, and the carcasses are flown to the capital.

In the southern portion of the interior plains the tropical grassland gives way to tropical rain-forest, and Colombia shares the Amazonian selva. In this area there is a little collecting of forest products. Rubber trees are common in the Territory of El Vaupes, but the quantity collected, some 30,000 tons at the present time, has declined during recent years. The river port of Leticia, in the extreme south-east, serves as an outlet.

There are no railways and very few roads in the eastern plains, and communications are normally by air or river. Aeroplane services link the isolated settlements to the rest of the country. In the more easterly parts

settlements cling very largely to the rivers and there is communication by launch and canoe along the Ríos Meta, Vichada, Guaviare, Inirida, Guiniá, Japura, and Putamayo.

Throughout history the inhabitants of Colombia have always preferred the highlands to the lowlands, but as these become overcrowded and all the good land is utilised attention will have to be directed to the lowlands; indeed, as J. J. Parsons says, "the future must lie increasingly in the warmer lowlands."^{*} There is much potentially good land in the lowlands, but before it can be developed and made productive, forest clearance, drainage undertakings, and irrigation schemes will be necessary. Also many areas are handicapped by lack of good communications. Improved transportation would without doubt lead to the opening up of new areas, areas which offer possibilities for such tropical crops as cacao, bananas, sugar-cane, rubber, spices, etc., and for cattle-rearing.

VENEZUELA

The name Venezuela means "Little Venice." It was given to the coastal territories around Lake Maracaibo by the early Spanish navigators, who saw in the pile lake-dwellings of the Indians a resemblance to Venice. When the Spaniards first explored the coast they found Indian tribes of Arawaks and Caribs settled along the shores and on the islands. These coast dwellers, victims of the unhealthy conditions, were much less virile than their kinsfolk who occupied the highlands in the interior.

Historical development follows a pattern frequently repeated in South America. First came the Spanish adventurers seeking "gold and glory," and the bases established for this quest developed as the initial settlements. During the earlier part of the sixteenth century a number of settlements were founded including Cumaná (1523), Coro (1527), Valencia (1555), and Caracas (1567), all of which were either on or near the coast. Penetration inland and subsequent conquest of much of the territory formed the second phase. The country became part of the extended domain of the Spanish Colonial Empire in South America. It was during this period that many of the interior settlements, such as Ciudad Bolívar—originally named Angostura—in the Orinoco basin, were established.

The weakness of Spain and the revolutionary movement under Simon Bolívar during the early years of the nineteenth century brought the Colonial Empire into collapse. Greater Colombia, of which present-day Venezuela formed a part, came into being in 1819. A decade later, Venezuela, under the leadership of Páez, seceded from Greater Colombia and, in 1830, established itself as an independent republic, adopting federalism as a principle of government. Until 1953 Venezuela was officially known as the United States of Venezuela, but in that year it changed its name to the Republic of Venezuela.

The fourth phase in the country's history may be said to date from the

^{*} "Colombia." *Focus*, vol. VII, March 1957.

First World War and is linked with the development of Venezuela's mineral resources, especially petroleum, discovered in 1922, and iron ore, of which there are rich deposits. The exploitation of these natural resources by foreign enterprise has brought prosperity to Venezuela, and she enjoys the unique position of having no external debt. Venezuela's sound financial condition is the envy of her Latin American neighbours.

Venezuela has an area of 352,143 square miles, making her the sixth largest South American state. The population, totalling about 9 millions, is only small, but has shown a fairly rapid increase during recent years. Most of the people are mestizos. Like all the countries in the north-western part of the continent, Venezuela shows great local and regional variety in physical conditions, population distribution, social development, and economic activities.

PHYSICAL FEATURES

Physically, Venezuela falls into four fairly clear-cut and distinctive regions: (1) the Maracaibo Lowlands and the narrow Caribbean coastal plains; (2) the Venezuelan Mountains, forming a great arc of highlands in the north; (3) the extensive Orinoco lowlands or plains in the central area; and (4) the Guiana Highlands, a great dissected plateau in the south-east.

The Venezuelan Mountains. These mountains, alternatively known as the Northern Highlands, consist for the most part of a great arc, some 600 miles long, which extends from the Colombian border eastwards to the Paria Peninsula.

Five distinct sub-regions may be recognised: (i) the Sierra de Perijá in the extreme west, which forms the western prong of the Cordillera Oriental, forming, at least along part of its length, the boundary between Colombia and Venezuela; (ii) the Sierra Nevada de Mérida, rising up to snow-capped peaks over 15,000 ft high, which form the eastern prong of the Cordillera Oriental fork; (iii) the Central Highlands, rising to heights of between 7000 and 9000 ft, which run in ridges parallel to the coast and westwards cut into the Sierra Nevada de Mérida; (iv) the Segovia Highlands, consisting of low mountains and dissected plateaus, beyond the town of Barquisimeto, which may be taken to mark the northern limit of the Sierra Nevada de Mérida; and (v) the North-eastern Highlands, a detached hill mass whose summits exceed 6500 ft.

The Venezuelan Mountains comprise about 12% of the total area of the country. These high and rugged mountains, frequently with steep slopes, form the real core of the country. Here live most of the people, here much of the agriculture is carried on, and here, with the exception of oil production, are to be found the major industries. The highlands, by virtue of their elevation, which modifies the temperature and induces relief rains, provide the most attractive areas for settlement, especially where intermontane basins with fertile soils offer opportunities for cultivation.

The Coastal Lowlands. These lowlands comprise: (i) the Maracaibo

Lowlands surrounding the Gulf of Venezuela and its southern extension, Lake Maracaibo, and (ii) the narrow northern coastal plains wedged between the abruptly-rising coast ranges and the Caribbean Sea. The low, shelving shores of the 5000-square-mile Lake Maracaibo are swampy and mosquito-infested, but here occur some of Venezuela's most important oilfields. The hot, humid Maracaibo Lowlands, though containing some of the country's finest agricultural lands, are, petroleum apart, poorly developed and thinly peopled. Along the Caribbean coast are narrow strips of coast plain. These restricted lowlands are often backed by steep mountain slopes and are thus hemmed in between mountain and sea. Hot, dry, and often covered with scrub, the plains are of little value, although here and there good agricultural land exists and is intensively cultivated.

The delta of the Orinoco is, perhaps, more properly considered as a portion of the Coastal Lowlands than as an extension of the Orinoco Plain, since it is separated to some degree from the interior basin by the narrow 'gap' between Llanos Hills and the Guiana Plateau, and by its swamp forest, which stands contrasted with the grassy plains of the *llanos*. The delta, in fact, forms a well-defined area. The Orinoco, when about a hundred miles from the sea, divides up into five main distributaries which fan out northwards and eastwards. The distributary channels are bordered by high natural levees, beyond which lie wide stretches of densely forested alluvial swampland.

The Orinoco Plains. South of the mountain belt lies the extensive lowland of the Orinoco—the area known as the *llanos*. Extending from the Sierra Nevada de Mérida in the west to the Orinoco delta, the plains slope gently eastwards. The Orinoco and its tributary, the Apure, drain this region; together, these two streams receive over 400 affluents.

The Orinoco Plains consist not of a single dead-flat, level lowland, as the atlas map might suggest, but, away from the river, of gently rolling plains with subdued mesas carved out of the sandstone rock. Bordering the sluggish streams, which meander extravagantly, are broad alluvial flats; these, during the rainy season, are subject to extensive flooding, and wide areas are inundated, producing for several months a semi-aquatic environment. With the cessation of the summer rains the flood waters recede, leaving behind stagnant pools which form breeding grounds for plagues of mosquitoes. Under the hot sun of the dry season the pools dry up completely and the land in its turn becomes baked and hard.

The Guiana Highlands. These highlands occupy roughly half—the south-eastern half—of Venezuela. South of the Orinoco, which skirts the Guiana Massif, lies the hilly region of Guiana. Some 50 miles or so south of the river the old rocks of the ancient Guiana tableland begin to appear and, although some outliers of these old rocks occur north of the Orinoco, for all intents and purposes we may take the river as marking approximately the boundary between the Orinoco Plains and the Guiana Highlands.

The highlands form the denuded remnant of an originally much higher plateau block. At present the region consists of rounded hills of massive crystalline rocks with, in the south, tabular sandstone mountains. The highest parts occur in the west central portion and on the border of Venezuela, British Guiana, and Brazil, where Mt. Roraima reaches 8620 ft in height. The general slope of the massif is northwards. Many streams, flowing northwards and westwards to the Orinoco and broken by numerous rapids, have dissected the old block.

These highlands are relatively inaccessible, and in many parts remain still unexplored; hence they are sparsely settled and little exploited. It is not unlikely that these highlands contain much potential mineral wealth.

CLIMATE AND VEGETATION

Venezuela lies entirely within the tropics yet possesses many varieties of climate. These climatic variations, which range from wet and dry tropical regimes, through temperate to alpine conditions, are essentially the result of the great differences in altitude between place and place.

At or near sea-level there is little variation in temperature either diurnally or annually. The coastal plains and the interior lowlands are hot throughout the year; in fact, some of the highest annual average temperatures in South America are registered in these regions: for example, the yearly average at Maracaibo is 86° F (30° C), at La Guaira 81° F (27° C), and at Ciudad Bolívar 82° F (28° C). In the highlands temperatures are, naturally, modified by the elevation, and at Caracas, which lies at 3025 ft, the average annual temperature is 71° F (22° C). Although day-time temperatures, especially at midday, produce a wave of heat, evenings and nights are sometimes chilly. At higher elevations temperatures are correspondingly reduced, and at about 15,000 ft the snow-line is reached.

Because temperature decreases with height, there is an altitudinal zoning of climate similar to that noticed in the case of Mexico. In the highlands of Venezuela an identical climatic stratification to that characterising the whole of the South American tropics is to be observed. Three well-marked zones, related to elevation above sea-level, are distinguished and designated as hot, temperate, and cold lands. The *tierra caliente* begins at the coast and extends to an altitude of about 3000 ft, with temperatures ranging from 78° to 82° F; the *tierra templada* lies between approximately 3000 and 6000 ft and has temperatures of from 54° to 77° F; and the *tierra fria*, lying above about 6000 ft, experiences considerably lower temperatures than in the temperate zone with alpine conditions commencing at roughly 10,000 ft.

Seasonal differences result from rainfall, not temperature; it is the occurrence and the absence of rain that forms the basis of the "summer" and "winter" seasons, the two distinguishable periods of the year. Maximum rainfall occurs at the time of the highest sun, while there is a distinct dry season at the time of the lowest sun. The summer or wet season extends from about April to November, the winter or dry season through the

rest of the year. Virtually the whole of Venezuela has a Tropical Summer Rain type of climate; only on the northern coastlands and where relief upsets the normal precipitation regime do modifications to the type occur. In the *tierra caliente* zone along parts of the Caribbean coast the climate may be hot and dry throughout most of the year (Coro has only 16.9 in. a year), yet hot, humid conditions prevail around the shores of Lake Maracaibo. In the tropical lowlands of the Orinoco basin Ciudad Bolívar has 38.8 in. of rainfall and San Fernando de Apure 51.9 in. Rainfall in the highlands, more especially the Sierra Nevada de Mérida, where the relief induces precipitation, is generally heavier; for example, Caracas has 32.2 in., Valencia 44.6 in., Mérida 71.0 in., and San Cristóbal 53.6 in.

In the *tierra templada* zone the climate is generally temperate, pleasant, and healthy, and the seasons are not so clearly differentiated as in the lowlands.

Because most of Venezuela has a Tropical Summer Rainfall climatic regime, most of the country has a savanna type of vegetation. Tropical grassland is the natural response to climatic conditions in tropical latitudes which have alternating wet and dry seasons. A characteristic vegetation of grassland, composed of coarse and often tall grasses, with drought-resistant species of trees, isolated in groves or near streams or occurring fitfully, is typical of wide areas. The Orinoco lowlands are grasslands, while extensive areas of the Guiana Highlands are also under savanna but much more thickly wooded. The Orinoco delta is covered with dense swamp forest.

Each of the three *tierra* zones has its own characteristic vegetation. In the *tierra caliente* deciduous forest covers large areas. In areas of more persistent and heavier rainfall a plant association more akin to true tropical forest occurs; epiphytic growths and a thick, shrubby undergrowth appear. On the other hand, where drier conditions prevail, as characterise the north-west coastal plain, a type of dry forest is found. In the *tierra templada* the vegetation varies from scrubby woodland to luxuriant forest. At higher altitudes in the Andean and coastal ranges grasses and herbaceous plants replace the forests. Alpine pastures extend from approximately 10,000 ft up to the snow line at around 15,000 ft.

POPULATION

The total population in 1954 numbered 5,858,000; in 1965 it was approximately 9,030,000. This is a small number for the size and resources of the country.

The population is predominantly mestizo, mainly of mixed Spanish and Indian blood, with along the coastal margin a considerable admixture of Negro blood. In various parts of Venezuela as, for instance, in the Guiana Highlands, the Orinoco lowlands, and in the region of the Sierra de Perijá, pure-blooded Indians are found, but, numerically, they are few. These aboriginal peoples are often wild and uncivilised, such

as the Motilone Indians of the Sierra de Perijá borderlands, who live a self-contained existence and who shun contact with the civilised population.

Approximately 70% of the population is concentrated in the Northern Highlands. A number of factors help to explain this concentration: historically it has always been the most important part of the country, climatic conditions, in general, are more genial and more healthful, and fertile intermontane basins and valleys provided possibilities for tillage. Another 10% or so of the population live in the Maracaibo lowlands; many have been attracted to this region through the development of the oilfields. The grassy plains of the Orinoco lowlands, though covering about a quarter of Venezuela, support less than a fifth of the total population. In the *llanos* region population is thinly and spasmodically spread. The exact numbers occupying the Guiana Highlands in the south of the country, which make up approximately half of the national area, are not known with accuracy; without doubt the total of inhabitants is small, consisting principally of scattered Indian tribes.

The Venezuelan Government, appreciating the country's need for increased numbers of people, is adopting a realistic attitude towards immigration. Foreign immigrants are being encouraged, and a trickle of incomers, represented by Italians, Frenchmen, Germans, Scandinavians, Poles, Hungarians, and Yugoslavs, is now taking place. Under a scheme currently in force, some 2000 Italians are entering Venezuela every month. Since the end of the Second World War some 800,000 immigrants from Europe have entered Venezuela—a number sufficiently large to have modified considerably the racial make-up of the country.

A point worth emphasising, and one with serious social implications, is the growth of towns and the increasing number of urban dwellers. Just as large numbers of peasants have migrated to the oilfields seeking more lucrative employment, so an increasing number of rural dwellers are moving into the towns and cities, attracted thither by the attractions of urban life and the prospect of an easier life. This influx of people from the countryside is beginning to result in overcrowding and the creation of slums. This is a problem which is not peculiar to Venezuela; it is a phenomenon characteristic of all the developing Latin American countries. Indeed, this drift to the cities is a feature of the world at large, although it is more serious in some countries than in others. An indication of this rapid urban expansion in Venezuela is provided by Caracas: its population has increased from 270,000 in 1940 to 660,000 in 1952 and to 1,675,000 in 1965.

NATURAL RESOURCES

After the soil, oil is Venezuela's most important resource. The importance of petroleum is such that it tends to overshadow the more mundane but not less necessary economic activities. While oil is the chief prop of the national economy and the revenue from it provides considerably more

In 1956 there were 2727 flow wells and 6772 pump wells in operation, although some of these were shut pending pipeline construction. In June 1963 the total number of producing wells was 10,350.

The winning of oil takes place in three areas: in the Lake Maracaibo lowlands in the west, in eastern Venezuela between the Northern Highlands and the lower Orinoco, and in the west-central plains of the Barinas-Apure basin.

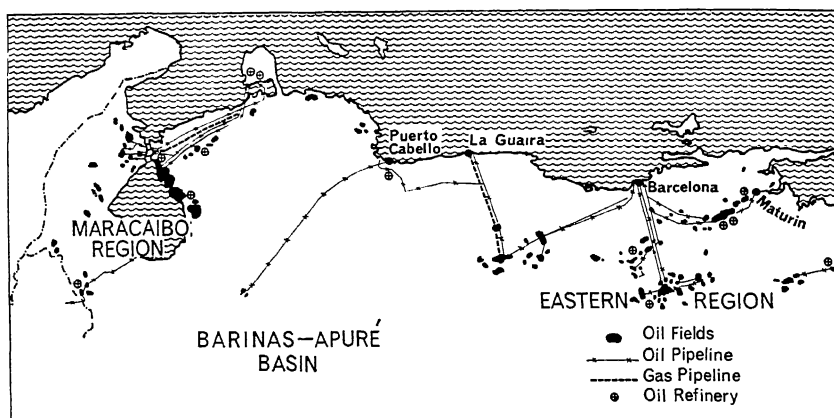


FIG. 69.—Venezuela: oilfields.

The basin of Lake Maracaibo has proved to be extraordinarily rich, the most prolific oil region in the whole of Latin America and one of the richest sources of supply in the world. The area, which has always been the most important centre of production, accounts for about three-quarters of Venezuela's output. In eastern Venezuela, which produces some two-fifths of the total, intensive exploration is under way, and recent tests have proved to be very successful. The country's third producing region, which was opened up in late 1958 consequent upon the completion of a 211-mile, 20-in. pipeline from the Barinas-Apure basin to Puerto Cabello on the Caribbean coast, may well prove to be as rich as the other two. The most important finds so far are in the Barinas, San Silvestre, and Silvan fields.

About a dozen foreign-owned companies, mainly American and British, operate in Venezuela. The Venezuelan Government, which receives 50% of the profits, has found it more convenient to let others exploit her oil resources than to undertake production herself. In permitting foreign exploitation the Venezuelans have proved themselves to be wise. Enormous capital expenditure is required in the oil industry, and such requirements, initially at any rate, were beyond Venezuela's capacity; had the country adopted an exclusive attitude like her neighbour, Brazil, her oil industry would, without doubt, be in the same parlous position as Brazil's. Instead, she has reaped rich revenues for a quarter of a century

and been able to invest these profits in schemes for social improvement and economic development.

In 1956, for the first time in eleven years, the Venezuelan Government granted new concessions. Fierce competition took place between the various companies for concessions in the Maracaibo region, where there are semi-proved reserves. Concession blocks were also granted in parts of the states of Zulia, Apure, and Táchira. The race for new acreage has brought a number of new oil companies into the country's greatest and still expanding industry.

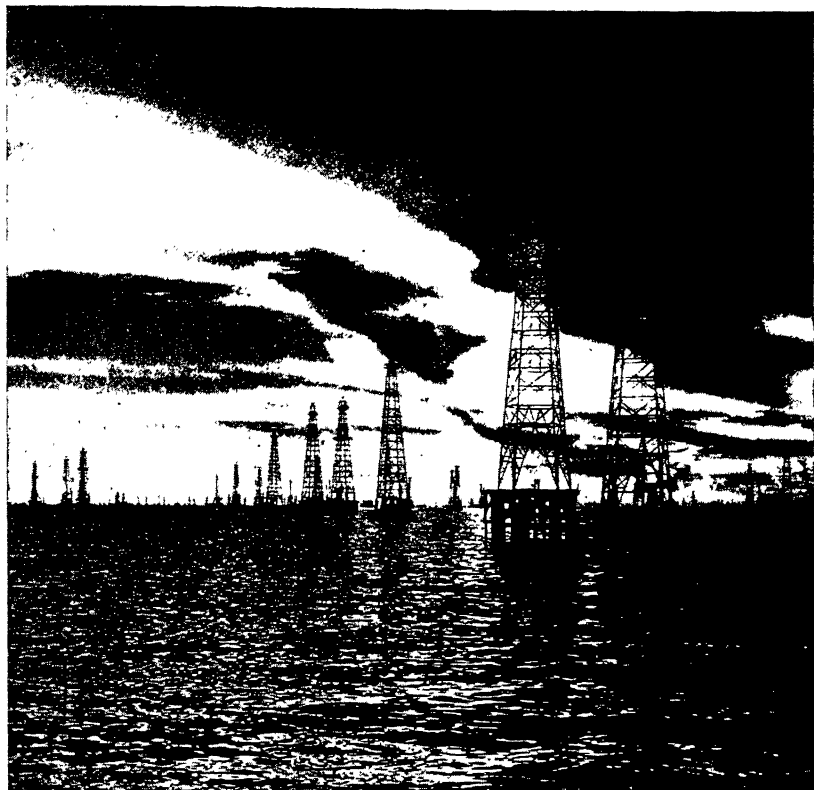


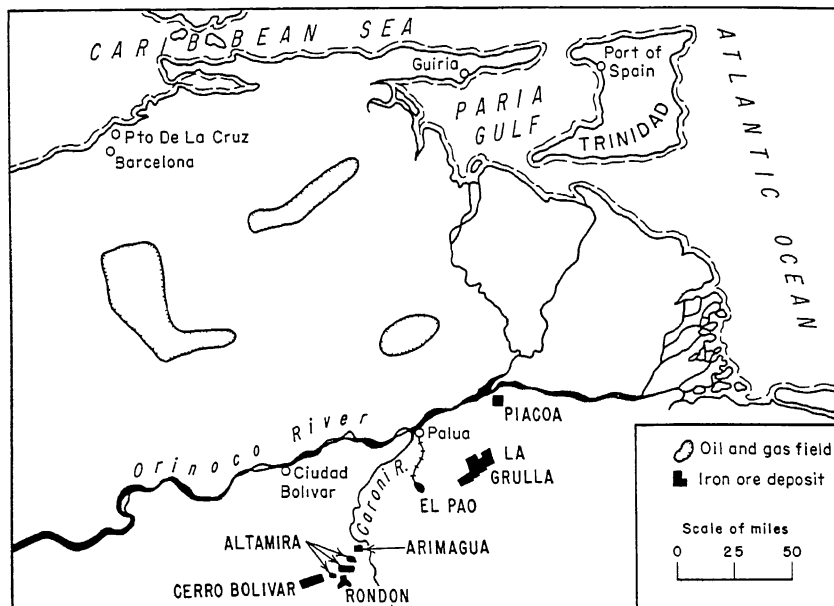
FIG. 70.—Oil derricks, Lake Maracaibo. Drilling for oil goes on 20 miles from the shore. Floating platforms, supplied by helicopter, carry all the apparatus needed to drill and raise oil from the rocks below the lake-bed.

Venezuelan petroleum varies in grade from heavy to light oil, but the country is very fortunate in possessing the largest reserve of heavy oil in the world, a fact of much significance, since it is these heavy oils from which fuel oil is derived. Moreover, because of the almost insatiable demand for fuel oil, not only from the United States, which is an extravagant consumer of such oil, but also from the world at large, Venezuela would seem to be assured of a constant and growing demand for her oil

products. During recent years Venezuela has begun to construct her own refineries. In 1961 she possessed fifteen operating refineries having a crude distillation capacity of just over 985,000 barrels a day and a cracking capacity of 160,000 barrels a day. Altogether, approximately a third of the oil produced is refined locally; most of the rest goes in shallow tankers to the great refineries in the Dutch West Indies.

IRON ORE

Iron ore has long been known to exist in Venezuela; indeed, as long ago as 1883 the Government granted a concession for its exploitation. The Venezuelan deposits, however, had to wait another half century before



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FIG. 71.—The iron-ore deposits of El Pao and Cerro Bolívar.

they began to be seriously developed. In 1939 an exploratory survey revealed the existence of enormous quantities of iron ore in the northern fringes of the Guiana Highlands. The tremendous demands made upon the iron-ore resources of the United States during the Second World War left her home supplies sorely depleted and, anxious to ensure that her ore requirements would be met, she began to seek foreign supplies. The United States turned to Venezuela as being one of the nearest countries able to offer large quantities of high-grade easily accessible ore.

Deposits of iron ore occur in a 300-mile belt east of the Caura River and south of the Orinoco in the north of the Guiana Massif. The most important concessions being worked are at El Pao, El Trueno, and Cerro

Bolívar. These concessions have been developed since 1949 by American capital. The concession at El Pao, which lies some 40 miles east of Ciudad Bolívar, was obtained by the Bethlehem Steel Corporation. The first consignment was shipped early in 1951. The ore is carried by railway to Palua on the Orinoco some 30 miles away, where it is loaded on to barges and thence carried downstream and across the Gulf of Paria to Puerto Hierro, a tidewater port. From here the ore is trans-shipped to ocean-going carriers and taken to its destination at Sparrow Point on Chesapeake Bay, United States. South-west of El Pao is the El Trueno concession which is connected by railway to Puerto Ordaz. The concession at Cerro Bolívar, located some 50 miles south of Ciudad Bolívar and approximately the same distance west of the Caroni River, is the most important. Here is the "Iron Mountain" estimated to contain 2000 million tons of high-grade ore averaging 63.5% iron content. The ore is mined by open-pit methods, and great electrically-driven machine shovels tear the ore out of the mountainside 20 tons at a time and load it into rail trucks. Long trains carrying 12,000 tons each journey transport the ore to the river-side at Puerto Ordaz, where it is loaded into ocean-going vessels and carried directly to the United States. The three largest bulk-cargo ore-carriers in the world are engaged in shipping this ore.

The exploitation of these extremely rich iron-ore deposits is being vigorously pursued, and in 1960 the output exceeded 20 million metric tons but dropped to 13 in 1963. Indeed, more than half of South America's total iron-ore exports now come from Cerro Bolívar, El Pao, and El Trueno deposits. It is possible that iron ore will come to rank second to oil in the Venezuelan economy.

AGRICULTURE

Three-quarters of the population are engaged in agricultural activities, and farming is of great importance in the economic structure of the country. Prior to the oil era, cocoa, coffee, and cattle formed Venezuela's staple exports and, although there is still a small export trade in these commodities, in comparison with the mineral products they are insignificant. Nevertheless, over 9 million people have to be fed, and the bulk of the people depend upon the land for their livelihood, hence agriculture cannot be either disregarded or neglected.

The amount of arable land is only small, a mere $3\frac{1}{2}$ million acres or one-sixtieth of the total area of the country. This by no means exhausts the cultivable area, but much of the best arable land is already being used. Much, too, has already been lost through wasteful practices.

While Venezuela possesses a great advantage in its varied climates, which enable her to grow a very wide range of crops, *e.g.* cacao, sugar-cane, coffee, cotton, tobacco, maize, and wheat, the agricultural picture is rather a sorry one. A number of problems and difficulties beset agriculture; these may be related to the natural conditions, the traditional agrarian system, the primitive methods of tillage, and inadequate transport.

The most suitable areas for human occupation, as we have already noted, are the highland regions. Many of these areas were, because of their steep slopes, naturally unsuitable for cultivation. However, they were cultivated, and it needs little imagination to realise the outcome: the hillsides became eroded and the soils were lost. Large areas have suffered severe erosion and been destroyed for purposes of cultivation. Nor is this all. Deforestation and erosion have directly affected rainfall run-off, and accelerated run-off in its turn has caused the streams to dump their loads of detritus on the lowlands, choking them in many places.

The traditional system of agriculture is both primitive and wasteful. The *milpa* or cut-and-burn system, known in Venezuela as the *conuco* system, is not only typical of native Indian farming but was also adopted by the Spanish colonists. Under this system land was cleared and burnt and then planted. When the soil became exhausted after bearing two or three crops the cultivator moved on and cleared a new patch. If the old plot happened to be on slope-land its impoverished soils were left free and open to gullyng and ultimate destruction.

The wealth derived from oil had an adverse effect upon agriculture: not only did it lead to decreased attention to crop growing but it also resulted in a drift from the land to the towns of hundreds of thousands of rural dwellers. Venezuela now grows insufficient food to meet its own requirements and is compelled to import foreign foodstuffs, even of such commodities for which the natural conditions are ideally suited. The change in government in 1958, when dictatorship was replaced by democracy, has led to a change in economic policy. The agricultural sector of the national economy is now receiving close attention, and agrarian reform, agricultural investment, the provision of rural amenities, etc., are aimed at checking the decline in agriculture, which has been a feature of the national economy since 1900. But this increased interest in agriculture is also aimed at stopping the outflow of the rural population into the urban areas and at a more balanced national economic development.

VENEZUELA: REGIONS (Fig. 72)

THE NORTHERN HIGHLANDS

The Northern or Venezuelan Highlands, which are an offshoot of the Andes, form the core area of the republic. Here are to be found the greater part of the country's population and, the oil industry excepted, most of the economic activity. The various subdivisions of this highland region have already been noted (p. 237); of the five divisions, the Central Highlands are the most important. These Highlands have several basins and valleys where gentler slopes and more fertile soils provide suitable conditions for agriculture, and in such depressions the population has congregated. Differences in altitude and exposure result in varied climatic conditions, and a fairly wide range of tropical and sub-tropical crops is produced. They include sugar-cane, coffee, cacao, cotton, and tobacco,

in addition to such subsistence crops as maize, rice, potatoes, and beans. Much of the land is also devoted to pasture, since cattle from the *llanos* are moved to these fertile pockets for fattening. The most important concentrations of population occur in the Valencia Basin, which lies at only 1500 ft, and is well watered and productive, the Valley of Caracas, and the Tuy Valley.

Caracas (1,675,000), the largest city and capital of Venezuela, is situated in the valley of the same name. It lies at an elevation of 3000 ft in a small basin some 15 miles long. No other town in the whole of Latin America has undergone such a rapid increase in population and shown such a rapid rate of growth during the past quarter of a century as Caracas. Well within living memory it was a small, quiet colonial town with narrow streets and single or double-storeyed dwellings; today, it is a large, expanding city with the newer sections built in spectacular style with huge, towering, glass and concrete buildings and wide avenues. The old part of the town, which goes back to 1567, is rapidly disappearing as new structures, architecturally impressive, pop up like mushrooms.

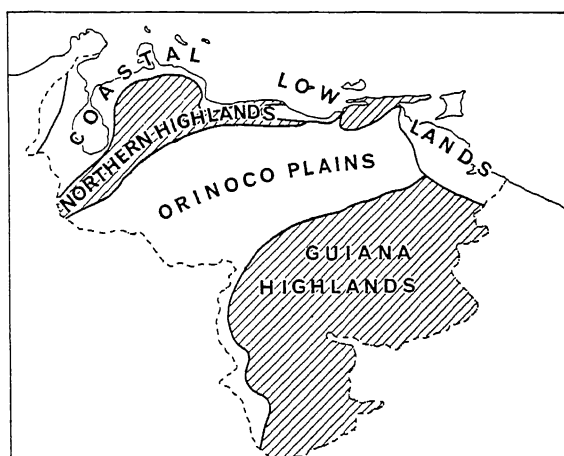


FIG. 72.—Venezuela: regions.

A great new highway—one of the finest in the world—links Caracas with its port, La Guaira, about 10 miles away. A generation or so ago Caracas had almost no industry; now it is the most important manufacturing centre in the country, with numerous industries. It is also the commercial, cultural, and administrative centre of the republic. This extremely rapid recent growth has been made possible by the wealth which has accrued from Venezuela's oil resources. The civic attractions of Caracas have led to an influx of rural population, and as a result of this during recent years something like 10% of the capital's active population has been unemployed. Caracas incidentally is not the only town to have suffered from this rural exodus: the drift from the countryside into the

urban areas has been a widespread feature in Venezuela during the past two decades.

Sixty miles west of Caracas lies the large Valencia Basin with the two cities of Valencia (163,000) and Maracay (135,000), the most important industrial centres after the capital. Textiles (cotton and rayon) are the leading manufactures, but there are also factories concerned with chemicals, rubber, cement, paper-making, sugar-refining, and food-processing.

East of the Central Highlands are the North-eastern Highlands consisting of two roughly east-west ranges. Eastwards the Coast Range decreases in height and ends in the Peninsula of Paria. The north-eastern portion of the Highlands receives plentiful rainfall, and tropical forest is characteristic. Cacao is cultivated in forest clearings. The western and south-western parts are, in contrast, relatively dry, and most of the people live in this area. Cumaná, the oldest European settlement in South America, with a population of about 73,000, Barcelona, just over half the



FIG. 73.—Caracas, the city centre. Money, derived from the sale of petroleum, has enabled the Government to re-build much of the capital. These modern, American-style buildings of ferro-concrete and glass are government offices.

size, and the new port of Puerto La Cruz (59,000), a thriving oil-refining centre, are the chief towns. Cumaná has an important sardine fishery and canning industry. All these towns, it should be noted, are coastal towns; there are no cities of any importance within the Highlands. The most important factor in the economy of the sub-region, however, is petroleum; oil deposits occur on the flanks of the Highlands, and the area is now producing about a third of Venezuela's total output of petroleum. The bulk of the crude oil is despatched by pipeline to Guanta, the commercial seaport of Puerto La Cruz, for export.

To the west of the Central Highlands lie the Sierra Nevada de Mérida and the Segovia Highlands. The Sierra Nevada de Mérida rising up from the tropical lowlands exhibit a vertical zoning through sub-tropical and temperate belts to the cool pasture lands of the *paramos* and finally to the permanent snows of the higher summit areas, which reach 15,000 ft. The majority of the people live between approximately 2500 and 6000 ft in the *tierra templada* zone and are concentrated in the valleys and basins. Most of the people are engaged in agriculture, especially the growing of coffee, and this sub-region is the most important coffee-producing area in Venezuela. Coffee is the most valuable of the country's agricultural exports. The principal towns in the Sierra are San Cristóbal (98,000), Mérida (46,000), Trujillo (19,000), Valera (46,000), and Barquisimeto (236,000).

The Segovia Highlands comprise a largely semi-arid area of dissected and, in parts, severely eroded uplands. The Highlands are covered for the most part with scrub vegetation, except for the eastern margins, which are moister and carry forest. The sub-region, as a whole, is not particularly attractive and is an area of sparse population. The chief activities are subsistence farming and grazing, with a little production of cacao, coffee, and sugar. The only town of note is Carora, centre of a populated locality.

In the extreme west is the Sierra de Perijá, which forms the fifth sub-region of the Northern Highlands. It is an area of no importance, very thinly peopled, and quite undeveloped.

THE MARACAIBO AND COASTAL LOWLANDS

The Maracaibo Lowlands are encircled on every side except seawards by mountains. They are very hot—the highest average annual temperatures in the whole of Latin America are registered there—and very humid, although the rainfall is not very high, ranging from about 15 in. in the north to around 40 in the south. Lack of wind, especially around the Lake, makes the climate rather trying, although it cannot be described as being unhealthy.

The northern half of the region, around the Gulf of Venezuela, consists of arid lowlands with little or no cultivation. The southern half consists of plains with large marshy areas but also containing some very good soils. There is little agricultural development except around Bobures, although the possibilities for cultivation are considerable.

Until 1917 this region was a poor, neglected area, its few inhabitants living by subsistence agriculture and a little fishing. The discovery in that year of petroleum led to a rapid transformation, for the discovery was the prelude to the opening up of one of the world's richest oilfields. Within a few years the Lake shores had become a forest of oil derricks—now they even cover part of the Lake itself—while Lakeside villages have grown into flourishing oil towns.

About three-quarters of Venezuela's petroleum derives from the Maracaibo Lowlands. The most important fields lie on the north-eastern shores of the Lake, but there are others to the west and south-west and along the coastal lowlands of the Gulf of Venezuela. Drilling has also been extended to the Lake itself; wells have been sunk beneath its waters, and the surface is studded with derricks. Some of the crude oil is refined in the area. Pipelines carry oil to the Paraguaná Peninsula, where there are refineries at Cardón (Shell) and Amuay (Standard Oil). Much of the oil, however, is sent to the nearby Dutch islands of Aruba and Curaçao, which possess great refineries. Formerly oil had to be shipped in shallow-draught tankers which were capable of negotiating the sand bar obstructing the outlet of Lake Maracaibo, but within recent years major improvements in navigation and terminal facilities have taken place: in 1956 a 34-ft channel was dredged across the bar, while a new seaport Las Piedras-Paraguaná has been built between the private oil-company ports of Cardón and Amuay.

Maracaibo (530,000) is the only city of any real importance in the region. After La Guaira, it is Venezuela's principal port, but its trade is dominated, overwhelmingly so, by its export traffic. Although Maracaibo dates from colonial times, it was a small, squalid, unprepossessing town until oil was discovered. It has grown rapidly during recent decades and been much transformed by rebuilding. The completion and opening in August 1962 of the 5-mile bridge which spans Lake Maracaibo, links Maracaibo, lying on the north-western shore, with the eastern shore of the Lake. This bridge is bound to benefit the city immensely.

In strange contrast to this active modern city and the progressive developments in the oil areas, there live within these same Lowlands wild, intractable Indians who will have no truck with either white men or even Indians belonging to other tribal groups. The Motilones live in the marshy country between the Rivers Santa Ana and Catatumbo on the western side of Lake Maracaibo some 70 miles south-west of Maracaibo city. They live a self-contained existence, never moving beyond the confines of their forested tribal territory but showing hostility to any trespasser. The Motilone Indians live in small groups in forest clearings, dwelling in oval-shaped community houses.

The coastal lowlands lying east of the Gulf of Venezuela are small, narrow areas wedged between the mountains and the sea. Ignoring the Orinoco delta, there are only two areas of any size: the first is the lowland immediately west of Puerto Cabello, the second the plain west of Bar-

celona. Both these localities suffer from a shortage of rainfall, but the soils are of good quality, and in places are intensively cultivated. Puerto Cabello (52,000), Venezuela's third-ranking port, is the entry to, and outlet for, Valencia. It is also linked to Tucacas farther westwards along the coast, and to Barquisimeto in the highlands by a standard-gauge 109-mile-long railway. At Moron, 15 miles west of Puerto Cabello, is the new giant petro-chemical plant set up by the Government.

The coastal lowlands between Carenero and Barcelona are arid, but there are lagoons along much of the coastal strip. Barcelona and the other coastal towns we have already noted in connection with the North-eastern Highlands. Offshore lies Margarita Island, 444 square miles in area, with a population of 70,000, many of whom are engaged in fishing and pearling. The island is also a popular holiday resort.

The Orinoco delta really forms part of the Coastal Lowland Zone. It forms a vast flat alluvial plain intersected by numerous distributaries and covered with tropical forest. The area is thinly peopled, almost completely undeveloped, and has few settlements. The most noteworthy is Tucupita, where there is an oil refinery based on a small oilfield and an airport.

THE ORINOCO PLAINS

South of the Northern Highlands as far as the main stream of the Orinoco lies the extensive plain commonly styled the *llanos*. The region is an area of marked seasonal rainfall: winter drought (November to May) alternates with summer rainfall (June to October). The vegetational response to this climatic regime is tropical grassland or savanna. The region is rather isolated and remote, and until recent years has remained a largely undeveloped area. There are distinct signs that this "backwater" is now coming into its own.

Since the *llanos* forms a natural grassland, it is primarily a region of extensive grazing, and cattle-raising has been the dominant activity here ever since the Spaniards introduced cattle during early colonial times. In the early stages of the industry the cattle were wild, roaming at will over the grassy plains; then semi-nomadic cattlemen, the *llaneros* as they were called, began to herd the animals; finally, the grasslands were partitioned into large holdings and a more closely controlled industry developed. Eventually, therefore, private ownership of the cattle was instituted, and this led to some improvement in the stock and to an increase in their numbers. Today there are some 4 million cattle on the *llanos*, and the quality of the herds has been improved by breeding.

The development of the cattle industry, however, has been handicapped by many factors, chief of which are the wet-and-dry tropical climate, the coarse poor-quality forage, the ravages of insect pests and diseases, and the poor transportation facilities. During the wet season the plains are subject to extensive flooding and the cattle have to seek refuge in the slightly more elevated interfluvial areas until the floodwaters subside. Under the hot sun of the dry season the grasslands become parched and

the clay soils baked hard. Poor-quality stock, insect pests, and diseases have also added to the difficulties of cattle-rearing. But in spite of the vicissitudes of climate, the poor pasture, etc., the *llanos* have been traditionally associated with pastoralism. In the main, the cattle industry has always been associated with the internal market, catering especially for the populations in the Northern Highlands. There is, as yet, little export trade, though this could be, and in all likelihood will be, developed.

In the past the cattle industry was more in the nature of a way of life than a major economic activity, but recent and current conditions and circumstances are transforming the industry. A great scheme aimed at mitigating the extremes of drought and flood, has recently been completed in the state of Guárico, which covers a large segment of the northern half of the Orinoco basin.* A rock and earth dam 100 ft high and $9\frac{1}{2}$ miles long has been constructed across the Río Guárico, a few miles upstream from the town of Calabozo. This dam has impounded the river's waters and led to the creation of a lake some 90 square miles in area with a storage capacity of 500,000 million gallons. A 300-mile network of irrigation canals has been built, reaching as far south as Corozo Pando and Camaguán, to carry water to thirsty lands. Thus over a quarter of a million acres, equal to half of Venezuela's former irrigated area, are now being supplied with water during the dry season. The Guárico dam, by controlling the river's floods and relieving the winter's droughts, has turned thousands of acres of the *llanos* into fertile agricultural land. The Guárico project, in addition to water control, has provided for the integrated development of the area and included soil survey, reseeding with better grasses, property-fencing, pest control, the provision of farm equipment and fertilisers, financial aid, and community facilities. The success of the Guárico scheme has led the Government to embark upon a similar, but even larger, scheme at Boconó.

In conjunction with the Guárico scheme, other developments aimed at improving the quality of the stock and the carrying-capacity of the grasslands have been undertaken. Several thousand pedigree cattle, including Zebu, Brahman, Santa Gertrudis, Holstein, and Swiss Brown, have been imported for breeding purposes in an endeavour to upgrade the stock. To offset the shortage of water during the dry season several hundred artesian wells have been sunk to tap subsurface water supplies, while the ponding of streams in natural depressions has produced numerous "reservoirs" capable of holding sufficient water to see the stockmen through the worst difficulties of the winter drought.

Another new factor entering into the economy of the Orinoco Lowlands is petroleum. Oil has already been discovered in this interior region and, with the recent completion (1958) of a 211-mile, 20-in. crude oil pipeline from the Apure-Barinas basin to the Caribbean coast, the *llanos* became Venezuela's third producing region. The oil concessions which

* BUTLAND, G. J. "The Development of the Venezuelan Llanos." *Geography*, vol. XLII, 1957, pp. 119-20.

have recently been granted in the states of Apure, Barinas, and Tachira may well result in the *llanos* region becoming a major oil-producing area.

The Orinoco Lowlands are sparsely populated. Most of the inhabitants live in small groups in scattered river-side settlements, around the headquarters of the cattle ranches, or in the newly developed mining localities. Towns are few, widely spaced, small, and characteristically situated on rivers, since in former times the waterways provided the only easy means of access into the plain. Ciudad Bolívar (64,000) is easily the largest centre. Originally called Angostura,* the town lies on the south bank of the Orinoco where the river narrows some 200 miles upstream. It functions as the commercial and trading centre for a vast portion of the Venezuelan hinterland, collecting and exporting hides, skins, balata, chicle, tonka beans, diamonds, and gold and importing and distributing various manufactured goods. A further 200 miles and more inland, right in the very heart of the *llanos* region, is San Fernando de Apure (24,000). Situated on the Apure river, a tributary of the Orinoco, it is the capital of the State of Apure. Until recently it was mainly a cattle centre, but with the granting of oil concessions within Apure it has gained an additional interest which has already brought it increased importance and may lead to its rapid growth.

THE GUIANA HIGHLANDS

The fringing hill country of the Guiana massif develops immediately south of the Orinoco. The land rises up gradually to the tabular summit areas of the south-east. The country bordering the flat-topped tablelands has suffered much dissection and is characterised by rounded hills or mesas and narrow valleys covered with semi-deciduous forest and savanna.

This extensive hinterland region, isolated and difficult of access, has remained almost completely outside the national economy until very recent years. Apart from a small output of gold in the El Callao area and of alluvial diamonds in the Caroni River valley, the Highlands have contributed little. But more recently this remote and neglected area has become of greater consequence and begun to make a notable contribution to the national exchequer. Most important are the enormous deposits of iron ore found on the northern flanks of the Highlands and now being mined at El Pao and Cerro Bolívar, developments which we have already discussed. Farther inland, in the upper Caroni valley, notably in the vicinity of Peraitepui, the production of diamonds has shown an expanding output. Manganese is also being mined at Upata.

Associated with the iron-ore deposits is the huge new Government Steel Works at Matanzas not far from Puerto Ordaz, the iron-ore shipment port. The steel plant is only in the first stage of development; its

* A point of interest is that Angostura gave its name to the famous bitters (used to lace gin) which were invented there in 1824 by a physician. Fifty years later the factory making bitters was moved to Port of Spain, which is still concerned with this unique industry.

productive capacity is 600,000 tons of finished iron and steel goods annually, but there are plans to double this figure. The Caroni Hydro-electric Scheme, which is to tap the tremendous hydro-electric potential of the Río Caroni, and supply the steelworks with power, was begun towards the end of 1954. It is estimated that complete regulation of the river would give a total output of energy approximating to 10 million kW.

All this development, however, is really confined to the fringes of the Guiana region. Although the interior appears to have considerable agricultural, pastoral, mineral, and water-power potentialities, these are unlikely to be seriously exploited for a long while to come. Since this region is still not yet fully explored, is very thinly peopled, and virtually devoid of communications, development will have to await survey, colonisation, communications, and capital investment. Even so, the initial probing of this great hinterland region may be said to have begun.

THE GUIANAS

THE THREE GUIANAS

The territories known as the Guianas developed as colonies of Britain, Holland, and France and were the only parts of the South American mainland which were not independent. In May 1966 the colony of British Guiana achieved its independence and took the title of Guyana. The Dutch and French territories, though no longer colonies, are not independent. The Guianas are distinctive, too, in that they are the only large territories in South America to have been developed by north European peoples. The Guianas—the name Guiana means land surrounded by water—occupy the basins of rivers draining to the Atlantic between the Amazon and Orinoco systems. They form a rather isolated area with marshy coastlands fronting the ocean and mountainous hinterlands effectively separating them from the Amazon and Orinoco basins.

The Dutch were the first to colonise Guiana, setting up a post on the banks of the Essequibo river in 1596. A little later the British established settlements in what at the present day is Dutch Guiana, and a short while afterwards the French were in possession of Cayenne. The subsequent

| | <i>Area square miles</i> | <i>Population</i> |
|----------------------|------------------------------|-------------------|
| British Guiana . . . | 83,000 | 650,000 |
| Dutch Guiana . . . | 54,000 | 330,000 |
| French Guiana . . . | 35,000 | 34,000 |

history of these colonial territories is somewhat confusing, for the respective territories changed hands on more than one occasion. The present division represents the apportionment of Guiana agreed upon by the three European powers after the Napoleonic Wars. British Guiana is the largest

of the three colonies, being only slightly smaller than Dutch Guiana and French Guiana combined. The total population of the three colonies is considerably less than 1 million, and over half are found in British Guiana.

THE PHYSICAL BACKGROUND

All three colonies have much the same conditions of relief, climate, vegetation, and soil. They may be divided topographically into three diverse belts: a narrow, flat, low-lying, and naturally marshy coastal strip; a tract of rolling plain covered with tropical rain-forest and savanna grassland; and, lastly, a zone of red sandstone highlands, deeply dissected and heavily forested.

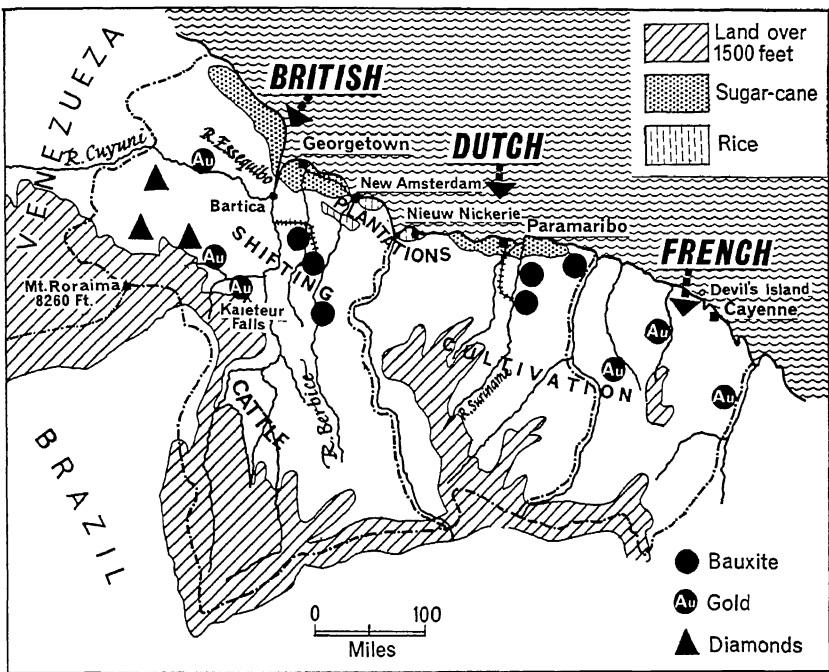


FIG. 74.—The Guianas: general features.

The coastal plain is of varying width, but is widest in the west, in British Guiana, where it is some 50 miles wide. It comprises, as we have just noted, two quite distinct zones: a narrow littoral belt, parts of which are actually below sea-level, which is subject to inundation by both river and sea and which has had to be dyked and drained; and an undulating plain which gradually rises up through crystalline uplands to the base of the mountains. The latter often rise up precipitously in sheer cliff faces. The Tumac-Humac Range in the east reaches a height of 3000 ft, but the Roraima Mountains, with their vertical faces and flat summit areas, tower

up in the west to nearly 9000 ft. These interior highlands have been savagely cut by racing rivers and are characterised by immense ravines and great waterfalls.

All three colonies lie close to the equator and have the highest annual temperatures in South America. They are well watered by the North-east Trades, which usually bring copious rainfall, approximately 80-120 in. There are two periods of rainfall maxima and two relatively dry periods, but the incidence of these varies slightly in the different colonies. Humidity is uncomfortably high but is tempered by the north-eastern winds, which make themselves felt throughout the whole year. Tropical forest, consisting of tall and for the most part slender trees rising out of a tangled growth of bush and creepers, covers most of the hill and mountain country, although the continuity of the dense forest is broken in places where porous, sandy soils give rise to stretches of savanna.

THE HUMAN BACKGROUND

Though the population of the Guianas is small, the peoples are just as diverse as those of the other Latin American countries—perhaps even more so. This very mixed population is the outcome of history. The indigenous inhabitants were, of course, Indians: today the native Indian tribes occupy the more isolated interior areas. During early colonial times sugar cultivation was the predominant—almost the sole—enterprise. The plantations were dependent upon slave labour, and Negroes were brought in to work them. The abolition of the slave trade by Britain followed by the abolition of the institution of slavery created an acute problem for the sugar planters. The emancipated Negroes failed to supply an adequate labour supply, and the planters were compelled to import workers. Although some Portuguese immigrant labourers came from the Azores and Madeira and a few Chinese arrived, the bulk of the imported labour consisted of indentured Hindus. Likewise, large numbers of Asiatic Indians and Indonesians were brought into Dutch Guiana. Hence the population at the present time is exceedingly varied racially and considerably mixed, comprising Europeans (less than 5% of the total), native Indians, Negroes, Hindus, East Indians, Chinese, mestizos, and creoles (mixed breeds of European-African descent).

It is interesting to note how these different elements have adapted themselves to the economic and social conditions. Many of the Asiatic Indians have now become peasant proprietors; the rest are agricultural labourers. E. W. Evans, describing the peoples of British Guiana, writes: "The thrifty and prolific Indians (*i.e.* Asiatic Indians), with their family solidarity and attachment to the soil, now provide the numerically strongest as well as a markedly stable element in the community."^{*} The Negroes have tended to drift into the towns and have become essentially urban dwellers. An exception to this general statement is provided by the bush Negroes, the descendants of runaway Negro slaves who escaped into the forests and

^{*} *Britannia Overseas*. P. 27.

turned native, living by hunting, fishing, and subsistence agriculture. The largest group of bush Negroes is found in Dutch Guiana, where it is estimated there are 22,000 of them. The Portuguese and Chinese elements have tended to become shopkeepers and control the retail trade.

BRITISH GUIANA

The half million people of British Guiana are spread over an area which is almost as large as Britain, but the overwhelming majority live close to the coast in the long, low strip of swampy, alluvial country, seldom 8 miles wide, which borders the ocean. British Guiana is in all essentials a waterside colony. This coastal tract is subject to flooding by the sea at high tide and by the rivers in their lower courses. To keep out the sea, embankments have been built and the original sea marshes have been drained. Much of this reclamation was done early on by the Dutch, who were skilled in such matters. Today these "front lands" are intersected with a network of artificial waterways—canals and drainage ditches—which serve a dual purpose, drainage and transport. Reclamation is still going on and a current drainage and irrigation scheme plans to bring 27,000 acres of coastal marsh land near the Dutch frontier into use.

Agriculture dominates the coastal belt, but only a small portion is suitable for and actually under cultivation; even so, practically all the cultivated land in the colony is in this region. Agricultural small-holdings compete for land with large plantations. Sugar is the principal crop, and Demerara brown sugar, together with molasses and rum, important by-products of the sugar-mills, normally account for about half the total exports in terms of value. Rice growing is making great strides, and approximately 100,000 tons are produced annually, more than enough to meet the colony's needs in spite of the fact that it forms the staple food of the East Indians, so that there is a margin for export. Other crops, chiefly grown on small plots for local consumption, include cassava, yams, plantains, sweet potatoes, maize, bananas, melons, and coconuts.

Settlement in the coastal district is chiefly in the form of compact villages. Nearly all the houses, which often are little better than dilapidated shacks, are built of wood, sometimes with corrugated-iron roofs, and are usually raised on piles to protect them not only from floods but also from troublesome ground insect pests. Georgetown (148,000), the capital and chief port, is by far the largest settlement. In and around Georgetown dwell approximately a quarter of the total population of the colony. The town stands at the mouth of the Demerara river on the right bank. The shallow draught sets a size limit of about 5000–6000 tons to vessels using the port. The bar at the mouth of the river restricts the maximum draught to 20 ft. Georgetown's trade is a seasonal one limited to the spring and autumn. Its blocks of buildings, intersected by a grid-iron pattern of canal and tree-lined streets give it a not unhandsome appearance. A disastrous fire destroyed much of the commercial section of the city, but new concrete structures have replaced the old wooden buildings. New

Amsterdam (12,000), the other main settlement, is sited near the mouth of the Berbice river and is connected to the capital by both road and railway, the latter, incidentally, being the first railway to be built in South America. Communications even in the coastal zone are not very well developed, and much transport is by water. Much field produce is carried in heavy iron punts which negotiate the canals intersecting the flat countryside.

Behind the coastal lowlands is an undulating plain which rises steadily to low plateau country, itself giving way inland to the lofty Guiana Highlands which culminate in Mount Roraima, 8630 ft in height. Most of these interior lands, whether low or high, are covered with dense, tropical rain-forest, with, in places, extensive grasslands. Much of this hinterland is, in truth, a "lost world." Within the forest live small migratory groups of Indians, primitive uncivilised peoples who depend for their existence mainly upon the chase, hunting forest animals and river fish. Most of them also practise a crude form of shifting agriculture, and grow manioc and vegetables.

The intermediate area of plain and plateau country contains the chief forest and mineral resources of the colony, and there has been some exploitation of the forests for their timber and of the rocks for their

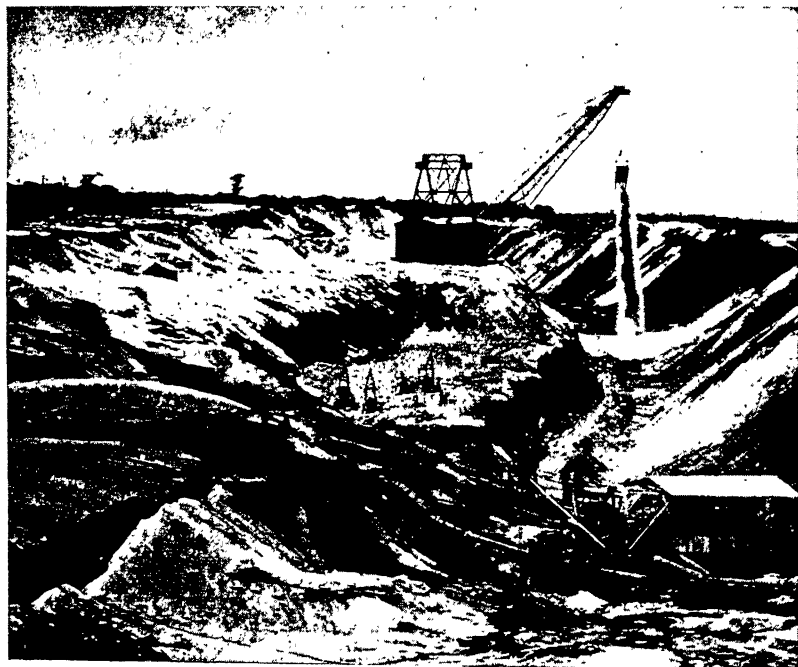


FIG. 75.—Bauxite mining in British Guiana. This photograph shows many different operations: (i) bush-clearing (*top left*); (ii) a dragline stripping clay and sand overburden (*top centre*); (iii) blasthole drilling of the bauxite deposit below the overburden (*centre*); and (iv) hydraulic stripping, *i.e.* breaking up bauxite by attacking it with water-jets (*foreground*).

minerals. Although approximately 85% of British Guiana is forested, only about a quarter of the forested area is regarded as being reasonably accessible and capable of being exploited upon an economic basis. Though rivers are used for logging, the factor of transport seriously limits the exploitation of the colony's immense timber reserves. The most valuable wood is greenheart, which accounts for nearly a half, by value, of the timber exports. There is no shortage of the precious greenheart, for the colony's Forest Department estimates the standing reserves at 32 million tons. Another forest product is balata-gum, used for many of the same purposes as rubber and especially for the manufacture of industrial belting.

Scattered among the forests are stretches of grassland upon which cattle are grazed. In the Rupununi hinterland some 40,000 head of stock are ranged. Previously the cattle were driven on the hoof over the 150-mile trail to Georgetown, suffering loss of weight in the process, but now the animals are slaughtered on the ranches and the carcasses shipped by air to the coast. A meat-packing plant has also been set up. Although cattle-rearing, on the coast lands as well as in the distant hinterland, both for local consumption and export, has become of increasing importance, two factors militate against the future expansion of the industry, particularly in the remote interior: first, the savanna grasses are coarse, poor, and lacking in nutritive value, and a large area is needed to support even a single beast and, secondly, distance presents a transport problem, though this could feasibly be overcome, as it already has been in some areas, by using air transport.

Mineral wealth seems to be the most promising asset of the colony. Gold and diamonds have long been worked by small groups of Negroes and mestizos known as "pork-knockers" who sift the river-gravels. Machine dredging for gold and diamonds is undertaken by a few companies. The most important mineral, however, is bauxite, which accounts for just over a quarter of all the exports by value (Fig. 75). One of the largest bauxite deposits in the world occurs in the vicinity of Mackenzie City 60 miles up the Demerara river. Mackenzie (12,000) and Bartica, the "take-off" town for the principal gold- and diamond-bearing areas, are "riverside towns with the gaunt and utilitarian appearance of towns that not long ago were bush camps."* Manganese deposits occur in the undeveloped north-west, and recently a 30-mile railway line has been laid down from the manganese-ore line to Kaituma.

British Guiana was a neglected colony for a long time, but recent political troubles have not only focused attention upon this out-of-the-way corner of the Commonwealth but also led to more active development of drainage and irrigation schemes, agriculture and industry and to the improvement of social conditions. Even so, unemployment is acute and there is a need to establish light industries, especially in view of the country's recent independence.

* EVANS, *op. cit.*, p. 28.

DUTCH GUIANA

Dutch Guiana, or Surinam as it is known to the Dutch, has an area of 54,000 square miles and a population estimated at 330,000. Surinam is similar to British Guiana, but is, generally speaking, less well developed. There is the same topographic pattern—three belts of coastal lowland, savanna plain, and interior highland—and the same economic pattern—a productive, populated zone in the coastal area and an interior highland sparsely peopled with forests and mines. In detail, however, there are minor differences.

Agriculture is mainly restricted to the coastal zone, although some plantations occur up the rivers. The heavy clay soils can be utilised only after empoldering, and there has had to be considerable land reclamation. On these polderlands a variety of crops is grown. Rice, which grows well, is the most important crop and provides both the staple foodstuff and the chief agricultural export. Citrus fruits, especially oranges, form the second most important export crop. Sandy ridges, which stand up above the marshy lowland, provide sites for various tree crops. A little coffee as well as cacao (which is not grown in British Guiana) and sugar-cane are grown.

Cattle-raising, though still small-scale and relatively unimportant, is increasing rapidly. There are great timber resources which are inadequately developed, although forest products—squared wood, sawn timber, plywood, balata—constitute an important export. The most valuable export, however, is bauxite, which is worked near the Cottica and Para rivers. Like British Guiana, Surinam possesses rich reserves of this aluminium ore, which derives from the weathering of the crystalline rocks of the plain. Bauxite has been worked in Surinam since 1916. About 3½ million tons are exported annually, most of it going to the United States. A large smelter and ore-reducing plant is in process of construction.

More than 40% of the people of Surinam dwell in Paramaribo (107,000), the capital and chief port. The city, with a characteristically Dutch air about it, lies 17 miles up the Suriname River. The only other sizeable settlement is Nieuw Nickerie (20,000), near the mouth of the Nickerie River, which serves the western portion of the coastal lowlands.

FRENCH GUIANA

Of the three Guiana colonies, French Guiana is territorially the smallest, has the least population, and is by far the most backward. Although it has an area of 35,000 square miles, which makes it one-third the size of France, it musters a total population of some 34,000, about a half of whom live in Cayenne, the capital and chief port.

Although the soils are fertile, there is little agricultural development, only a mere 9000 acres being under cultivation. There are very few plantations, no railways, and the few roads, which frequently are little more than tracks, focus on the capital. There is a small export of rum

distilled from sugar-cane and of coffee and cacao. Maize, manioc, sweet potatoes, bananas, and tobacco are grown for local consumption.

In the hinterland there are forest and mineral resources as yet little touched. Gold mining has overshadowed other activities in the past. Like the other Guianas, French Guiana possesses bauxite deposits, though these have never been developed. There are plans, however, to work the Boké bauxite deposits. In addition, several other minerals, including iron, copper, silver, lead, mercury, and phosphates, are known to exist, but in unascertained quantities. There is abundant forest wealth too, but this resource has scarcely been broached. Some hardwoods are exported, a little rosewood extract is produced, and a small amount of balata collected.

Imports, by value, are nearly ten times the exports. This is a measure of the economic backwardness of the colony. There is need for considerable expansion in agriculture, stock-raising, forest exploitation, and mining. There is need, too, for more people in this scantily populated colony, and immigration should be encouraged. But, like its British and Dutch counterparts, French Guiana has been neglected by the home government.

For one thing French Guiana is undeservedly famous. Off Cayenne lies the notorious *Île du Diable* ("Devil's Island"), a rocky island which was used until 1945 as a penal station and to which many of France's worst criminals were transported.

Chapter VIII

THE CENTRAL ANDEAN REPUBLICS

ECUADOR

THE Republic of Ecuador, with an area of some 106,508 square miles, derives its name from the equator, which passes through it just north of the capital, Quito. It is the second smallest state in South America. The Galapagos Islands, an archipelago of several hundred small islands, lying 500 miles offshore, were annexed by Ecuador in 1832 and form the province of Colon.

By virtue of its position astride the Andes, it is, like its Andean neighbours, divided into sharply contrasting geographical regions: the Pacific coastal margin, the Sierra or Highland portion, and the Oriente or Eastern Lowlands. These three regions have markedly differing physical, climatic, and vegetational conditions; moreover, the three parts show different degrees of settlement and development. The region to the east of the Andes is still very largely unknown.

Ecuador has a total population of more than 5 million. Approximately 40% live in the coastal region, about 58% in the highlands, and the remaining 2% in the Oriente. Estimates of the racial composition of the Ecuadoreans vary: Indians and mestizos make up about 85% of the total—perhaps in roughly equal numbers—people of pure Spanish ancestry account for about 8%, pure Negroes 3%, and the remaining 4% are mixed types of white, Indian, and Negro stock, *i.e.* mulattoes, zambos, etc. The pure-blooded Indian tribes of the Oriente are primitive and backward and have little, if any, contact with the rest of the people of Ecuador.

THE PHYSICAL BACKGROUND

The Andes run through the country from north to south in two parallel ranges known as the Western and Eastern Cordilleras. The mountains contain many majestic volcanoes bearing magnificent names: Chimborazo (20,498 ft), Carihuirazo (16,515 ft), Iliniza (17,405 ft), Cococachi (16,300 ft), in the Western Cordillera and Cotopaxi (19,498 ft), Antisana (18,864 ft), Cayambe (19,160 ft), Tungurahua (16,690 ft), and Sincholagua (16,365 ft) in the Eastern Cordillera. Between the two Cordilleras lies a plateau 7000–9500 ft high. Transverse ranges, eight in all, link the two Cordilleras together and divide the plateau up into compartments or basins called *hoyas*. In this inter-Andean region lie many small lakes.

The Pacific coastal lowlands, some 425 miles long and 50–150 miles wide, comprise river valleys separated by mountain spurs together with

a narrow coastal plain lying to the east of the Gulf of Guayaquil. The Sierras rise up sharply from the coastal lowlands to heights of 10,000 ft and over. Several rivers flow down the Andean slopes to the Pacific. The eastern slopes of the Eastern Cordillera descend to the forested plains of the Amazon. The rivers here are tributaries of the Amazon.

Because of Ecuador's equatorial location, climatic conditions on the coast and in the eastern lowlands are tropical. Elevation brings about a great reduction in temperature, and upon the basis of altitude four climatic zones are commonly distinguished: the *Tierra Caliente* (the lowlands; below about 5000 ft); the *Tierra Templada* (between roughly 5000 and 9000 ft); the *Tierra Fria* (the intermontane plateau; about 9000 ft and above); and the *Tierra Nevada* (the snow-covered mountain-tops). Along the Pacific coast a sequence of changes occurs from north to south: the tropical rain-forest of the north gives way to tropical savanna, which, in turn, is succeeded by desert in the south. On the plateau conditions are temperate, about 55–57° F (13–14° C), with little daily or seasonal change. In the Oriente hot, humid conditions prevail and give rise to selva.

THE ECONOMY

Accurate figures of land utilisation are not easy to come by, but the following may be accepted as a fair estimate: arable and orchard 4.5%; permanent meadow and pasture 6%; forest and woodland 55%; and waste land 34.5%.

Agriculture is predominant in the Ecuadorean economy and supports some 62% of the economically active population. But in spite of a preponderantly agrarian population and the major importance of agriculture in the country's economy, only a very small proportion of the total land area has been brought under cultivation. It is possible that some areas at present classed as pasture land and woodland, in addition to some land designated as being unsuited for tillage, could be used. Utilisation of such land, however, involves clearance, irrigation schemes, and increased communications. It has been estimated that as much as 10% of the total land area could be classed as cultivable.

Almost half of the currently cultivated land is in the hands of a few great landowners (1% of the proprietors). Methods of farming are characteristically primitive and there is very little farm mechanisation. Traditional conservatism, the land-holding system, and the cost of machinery all militate against improved methods of agriculture. Crop yields accordingly are generally low. During recent years agricultural output, it is true, has increased, but this has resulted rather from the extension of cultivated land (mainly in the coastal zone) than from any increased productivity.

A wide variety of crops is grown. The more important tropical crops, cultivated in the coastal region, are bananas (Ecuador is the world's largest exporter), cacao (long the economic mainstay of the country), coffee,

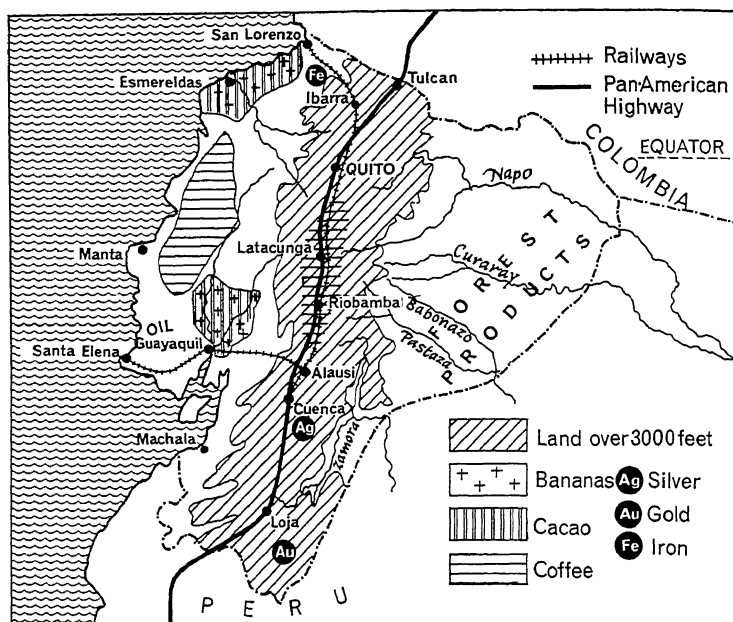


FIG. 76.—Ecuador: general features.

sugar, and rice. Bananas and yucca, together with rice or maize, form the staple foodstuffs of the people in the coastal lands. On the central plateau temperate crops, such as wheat, barley, potatoes, and vegetables, are grown. There are valuable forest products, chiefly hardwoods, balsa wood, and cinchona bark. There is some animal husbandry, mainly cattle-raising (about 1 million head) on the coastal plains, and sheep-rearing (about 1½ millions) in the highlands.

Although gold, silver, copper, and lead are worked on a small scale, Ecuador does not appear to have the rich bodies of metallic ores that characterise the other Andean republics. Among Ecuador's mineral resources petroleum takes first place. Oil is produced in the Santa Elena Peninsula. Production is about 9000 barrels daily. Three refineries deal with most of the Ecuadorean production. Proved reserves stand at about 30 million barrels. Oil production, however, has fallen steadily since 1955.

Viewing Ecuador as a whole, the country is poor in natural resources; even so, much more could be done to make the best use of what resources she possesses.

CURRENT DEVELOPMENTS

Ecuador, like most other Latin American countries, is developing manufacturing industry, in the belief that this will vitalise and balance the national economy. Limited development along these lines cannot do anything but good. Economic necessity demands a measure of industrialisation, but there is the danger, not confined to Ecuador alone, that industry

will be developed largely for prestige purposes, which may be against the general interests of the state.

At present only about 15% of the economically active population is engaged in manufacturing industries. Industry is underdeveloped, if not quite undeveloped; such as exists is chiefly concerned with the processing of foodstuffs, the making of beverages and drinks, and textiles, mainly cotton and rayon goods. The cotton industry, with its 25 factories employing 6,690 people, may be fairly described as the principal industry. Of the other lesser manufactures oil-refining, sugar-refining, footwear, cement, and Panamá hats, made by hand from toquilla palm straw, are the most significant. By and large, Ecuador's manufacturing industries are small-scale, strictly localised, and inefficient by British standards. The highland province of Pichincha (in which Quito lies) and the two coastal provinces of Guaya and Manabi possess most of the industrial units and account for considerably more than four-fifths of the country's total industrial output.

Currently much emphasis is being placed upon the role of industry in the national economy, and the modernisation and expansion of industrial manufacture is being carried out. The textile industry is receiving especial attention and is being overhauled to bring it up to date. Cotton textiles are almost wholly consumed internally. Prospects of finding markets in neighbouring countries are, however, not very promising, since most of Ecuador's neighbours already produce, or plan to produce, their own textiles. Moreover, the internal market is only small because of the small population and the generally low purchasing power of the people.

The *Junta de Planificación*, whose function is to explore the possibilities of, and make plans for, industrial expansion, has made several recommendations, including the exploitation of non-metallic minerals, an increase in electric-power plant, the expansion of the paper-making industry, the setting up of a sheet-glass factory and of a bottle-making plant.

A pre-requisite of industrial expansion is adequate power resources. The country's rivers have a large power potential and could be developed to produce sufficient hydro-electric power to meet Ecuador's needs in the foreseeable future. The present reliance upon thermal electric plants, which are dependent upon imported fuels, is uneconomic when water power is available. It is planned to increase the inadequate installed capacity and a 20,000-kW hydro-electric plant, not far from Quito, is already scheduled.

Ecuador's steel requirements are small, but as a token of her desire for industrialisation a steel plant, her first, has been built (1960) near Guayaquil at a cost of about £5 million. The plant's estimated annual output will be about 33,000 tons of finished steel products—approximately half of the country's current yearly needs.

Another development that is planned is the expansion of the paper-making industry. At present Ecuador has to depend very largely upon imports. But there is a small factory already in existence at Latacunga,

and it is estimated that if this mill was modernised and expanded it could meet the domestic needs for newsprint. Waste from the banana plantations might feasibly be used, and would offer a cheap supply of raw material.

COMMUNICATIONS

In general, communications are not very well developed and are inadequate to meet national needs. Physical conditions are largely responsible for this state of affairs; not only has the pattern of the topography hindered railway and road construction but buildings and maintenance cost are also heavy. Steep gradients involve zigzag routes, while frequent landslides during the rainy season involve continuous repair.

There are 698 miles of railway track. The usual gauge is 3 ft 6 in., but about 100 miles are on another gauge. The main line runs from the port of Guayaquil to Quito and thence beyond to Ibarra. In a distance of 50 miles the railway climbs 10,626 ft. Until 1957 the railways were under state control. The Government is hoping that under private enterprise foreign investment will be forthcoming so that the railway system can be modernised and expanded. The most recent communications project has been the extension of the main north-south railway line north-westwards from Ibarra to the coast at San Lorenzo.

In 1963 there were just over 6000 miles of highway, but only about half the mileage consisted of permanent road, the remainder being passable only during the dry season. The backbone of the road system is the Pan-American Highway, which runs from Tulcan on the northern frontier via Ibarra, Quito, Latacunga, Riobamba to Cuenca; between Cuenca and Loja there is a break, then the highway continues southwards to the Peruvian boundary. In 1959 Ecuador received a loan of £2½ million from the World Bank to help her complete the missing link in this most important line of communication. Recently a new paved road has been built connecting Quito to the main port of Guayaquil. In contrast to the railway and road systems, air services are comparatively well developed: not only is Ecuador linked by commercial air lines to the other South American republics but internal services are also operated between all the larger cities.

TRADE AND COMMERCE

Unlike some of the South American republics, Ecuador has no single large source of revenue upon which the treasury can lean; neither, as we have already commented, is she richly endowed with natural resources. Nevertheless, her economy is reasonably sound. During recent years she has enjoyed economic stability. Prices have been kept down and the cost of living contained, a situation in marked contrast to that which has obtained in Bolivia, where inflation has prevailed and the cost of living has rocketed.

Apart from exercising the traditional monopoly in alcohol, tobacco,

and salt, the Government does not interfere to any great extent in the national economy. As mentioned earlier, it has withdrawn from the control of the railways and handed them over to private enterprise. In some spheres of economic activity, such as the development of hydro-electric power resources, the Government will be compelled, of course, to participate. But government policy favours foreign investment, and there are few discriminatory controls on the profits of foreign capital. In this way the Government hopes to attract outside investments.

Ecuador's chief exports are bananas (about 60%), coffee (15%), cocoa (12%), rice, sugar, and petroleum. Minor items are figs, balsawood, vegetable ivory, and cinchona bark. Panama hats, once renowned, are now of little significance. The principal imports are vehicles, machinery, pharmaceuticals, wheat, fats and oils, and tobacco. For a number of years the United States has been Ecuador's major trading partner, taking just over half the exports and supplying well over half the imports. The remainder of the trade is chiefly with European countries, notably West Germany and Belgium. Trade with the United Kingdom is of only modest proportions. In 1953 Ecuador joined the Act of Economic Union with Argentina and Chile.

ECUADOR: REGIONS (Fig. 77)

THE PACIFIC COASTLANDS

The lands lying between the Andes and the Pacific Ocean cover some 60,000 square miles. The region is commonly called Pacific Ecuador or the Pacific Lowlands. Except in the extreme north and south, where the region narrows to 50 miles or less in width, the territory is approximately 100 miles wide. The lowlands are diversified by a series of hills, rolling to rugged in character, which separate the river valleys. The rivers Guayas and Daule, which are navigable for considerable distances, have provided the most extensive and most important area of lowland in Pacific Ecuador. Farther south, to the east of the Gulf of Guayaquil, is a narrow strip of coastal plain about 25 miles wide.

A variety of climatic and vegetational conditions occurs in the region. While temperatures are consistently high—mean monthly temperatures are between 76° and 80° F (24° and 27° C)—rainfall shows great differences between the northern and southern sections of the region. In the north abundant precipitation, amounting to from 50 to 80 in., falling mainly between December and June, supports rain-forest. Southwards the rainfall decreases markedly, and so the tropical evergreen forest is succeeded by semi-deciduous forest, which, in turn, gives way to dry scrub-forest and savanna as the dry southern coastal area is reached.

The Guayas Lowland, comprising the lowlands of the Guayas and Daule rivers and the plains abutting on to the Gulf of Guayaquil, is the most important area of Ecuador from the commercial point of view. This

area produces many cultivated tropical products, but especially cacao, coffee, bananas, and rice. The flood-plain country, which is subject to inundation during the wet season, is mainly devoted to rice culture and cattle grazing. The better-drained alluvial fans along the bases of the hills are given over to plantations of cacao, coffee, and bananas.

Guayaquil (500,000), situated on the western bank of the River Guayas, some 35 miles upstream, is the chief town of the lowlands and the outlet for the fertile and productive Guayas valley. It is, moreover, the principal port and commercial centre of the republic. Its port facilities have been extended and modernised, but they are still somewhat inadequate for the volume of traffic that it has to handle, for the bulk of the country's exports and imports pass through it. Guayaquil is changing rapidly, a change largely due to its expanding trade. The old Guayaquil with its timber houses is being transformed, and buildings of concrete and steel are now rising up everywhere. The commercial activity and prosperous air of Guayaquil contrasts strongly with the leisurely, colonial atmosphere of Quito.

Opposite Guayaquil, on the left bank of the Guayas River, is Eloy Alfaro (formerly Duran). It is a railway centre and the starting-point of the 290-mile single-track line, opened in 1908, which links Guayaquil with Quito. Westwards from Guayaquil, a railway runs to La Libertad, the port of the low, dry Santa Elena Peninsula, where, at Ancon, there is drilling for oil and a refinery. The peninsula is also noted for its salt refineries. Here the Government owns and operates several salt pans, where salt is recovered from sea-water by solar evaporation. The locality has also been developed as a resort. To escape the oppressive heat and humidity of the rainy season (January to May) many of the wealthier inhabitants of the Guayas-Daule Lowland holiday there.

The northern part of the Pacific Lowlands is much less well developed, although there are many areas of potentially good agricultural land. There are many small, scattered settlements in the valleys and hills, but no towns of any note except Esmeraldas (13,000), standing at the mouth of the River Esmeraldas. The small fishing settlement of San Lorenzo is developing into a boom town now that the railway extension from Ibarra to the coast has been completed. Here in the north the economy of the people is based upon milpa agriculture, forestry, forest gathering, and fishing. In the vicinity of Esmeraldas cacao and tobacco are grown, and the building of a road to Quinindé will assist the development of an area well suited to the cultivation of bananas, coffee, and rice. Some tropical timbers, such as balsa and mahogany, are cut, and tagua nuts (vegetable ivory) are collected from the tagua palm, which is abundant in the coastal region of the provinces of Esmeraldas and Manabi. The gathered nuts are dried and exported for the making of articles such as buttons. A speciality of the north is the fashioning of Panamá hats, which are made from the leaves of the toquilla palm. The leaves are dried, and shredded to form straw, which is then plaited by hand. Hat manufacture, however,

is a declining industry. There is a small amount of gold panning in the Santiago and Cayapas Rivers of Esmeraldas province.

As a result of the completion of the Ibarra-San Lorenzo railway and the development of San Lorenzo as a port, the way is now clear for increased banana production in northern Ecuador, a development hitherto hindered by inadequate transport facilities. Moreover, the new rail link with Quito via Ibarra could result in San Lorenzo becoming an important outlet and inlet for Sierran exports and imports.

THE ECUADOREAN HIGHLANDS

Highland Ecuador consists of the two Andean Cordilleras with their intermontane plateau. The Western Cordillera ascends rather abruptly from the coastal lowlands, as the railway which climbs to a height of 10,000 ft within a distance of 50 miles shows. The Eastern Cordillera drops to the lowlands of the Amazon with a more gradual slope. Between the two gigantic ranges with their towering volcanic cones reaching into the zone of perpetual snow lies a 300-mile-long structural depression which forms a plateau. Transverse mountain spurs have divided this plateau into ten compartments or basins lying at elevations between 7000 and 10,000 ft. These basins, or *hoyas*, lie at increasingly higher altitudes as one travels northwards.

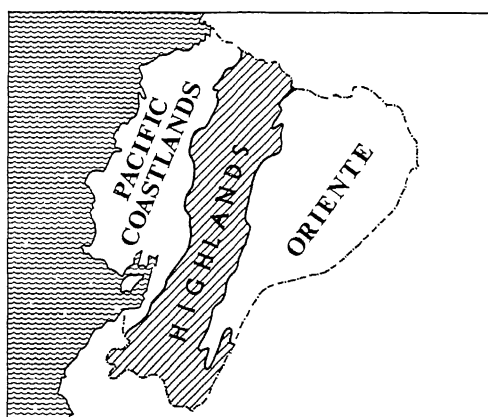


FIG. 77.—Ecuador: regions.

The climate of the plateau is characterised as *tierra fría*. Due to the high elevation, temperatures are always cool. By day they are in the mid-fifties, and the readings never vary by more than one or two degrees. Hence there are no seasonal changes, and the people have described their climate as one of "eternal spring." In contrast to the very slight annual changes, diurnal variations are great. Under an almost vertical sun and because of

the rarefied air, the land warms up quickly by day; by night, however, there is equally rapid re-radiation, and the land loses its heat quickly. Hence the nights may be really cold. Mornings are typically bright and sunny and invigorating, while the afternoons are frequently cloudy, with rain falling on two days out of every three. Rainfall varies widely; sheltered valleys and basins often receive less than 20 in., but Quito has 58 in.; exposed mountain slopes catching rain-bearing winds may have as much as 100 in. Such exposed slopes are usually forest-covered up to approximately 10,000 ft. Between the upper limit of the tree-line and the snow-line the mountain slopes are under grass and provide valuable pasture lands.

The intermontane region forms the heart and core of Ecuador. Well over half of the total population dwells in the highlands. The fact that the plateau was historically the most important part of Ecuador and was chosen by the Spaniards as a centre of settlement in preference to the unhealthy coastal lowlands explains to a considerable extent why this region is of such significance. During recent years, however, there has been something of a shift in the centre of gravity of the republic—the economically significant part already lies in the Pacific Lowlands—and many Ecuadoreans believe that the real future of the country lies in the coastal regions. For the present, however, the plateau remains dominant.

The people of the plateau are mainly pure-blooded Indians or mestizos of predominantly Indian strain. The white Ecuadoreans, who had Spanish forbears, are to be found chiefly in the larger towns. Throughout the highlands agricultural and pastoral activities engage most of the people, for there is very little mining and, as yet, few manufacturing industries apart from craft and domestic manufactures. There is a distinct cleavage between the activities of the white and upper-class mestizo elements, who are landowners, have managerial positions, or form the professional class, and the Indians and lower-class mestizos, who are labourers either on the land or in factories. Much of the agricultural land is held in large estates and many of the Indians live as farm labourers (*huasipungos*) tied to the land; but some of it is in the hands of village communities and is worked under a system of communal land tenure.

Many of the basins with soils derived from weathered lava and volcanic ash spewed out from the nearby volcanoes, are very fertile and form centres of population clusters. Although soils are frequently good and irrigation is often resorted to, agricultural yields are prevailingly low, a result mainly of the primitive farming implements employed and the backward methods practised. The soil, instead of being properly tilled, is merely broken on the surface by a primitive plough or hoe while most agricultural processes are done by hand. The land, in fact, is being inefficiently farmed and, as a consequence, the output is well below what is possible. The chief crops are quinoa, a bread grain, wheat, barley, and maize, peas, beans, potatoes, and other vegetables.

Pastoralism is an important activity in the highlands, especially in the

mountains, where it forms almost the sole support of the Indian peoples. Sheep and llamas are herded on the high grasslands, which lie generally above 11,500 ft. Periodically they are brought down the mountains for fattening, when they are fed on alfalfa grown in the basins of the plateau. Dairy farming is also carried on on a small scale in the basins.

Settlement in the highlands is, as we have already noted, clustered in a series of depressions. Quito, lying at an elevation of about 9350 ft, is situated in the north-central part of the plateau. It occupies an agriculturally productive area mainly given over to commercial farming. The capital city, perched in its high mountain basin, is a quiet, attractive town where life proceeds at a leisurely pace. Quito has numerous churches and buildings built in the Spanish colonial style. Unlike many other capital cities of Latin America, such as Mexico City and Bogotá, Quito retains its old charm and has not been desecrated by modern concrete and glass. Its population is about 384,000.

About 100 miles south of Quito is Riobamba (40,000), capital of the province of Chimborazo. It lies on the Guayaquil-Quito Railway and on the Pan-American Highway and is the centre of an arable and pastoral area. In Ecuador, Riobamba is famed for its Saturday fair; on this day the little town becomes a mecca for all the people in the surrounding districts. Cuenca, another hundred or so miles south, is Ecuador's third city (63,000). With its old buildings and cobbled streets, it is very much a town of the colonial era. Cuenca is a centre of toquilla hat production or, more correctly, hats from nearby Azogues are brought here to be finished off.

THE ORIENTE

Eastern Ecuador, known as the Oriente, comprises the territory east of the Eastern Cordillera. It embraces the wet, densely forested Andean slopes, or *montaña*, and the hot, humid *selva*, a portion of the Amazon basin. Formerly, Eastern Ecuador covered a much larger area, but, as a result of hostilities with Peru in 1941, a huge slice of the Oriente was lost. Tension still exists between Ecuador and Peru, and an uneasy peace reigns only through the diplomatic pressure exerted by the United States, Brazil, and Argentina.

The Oriente is a region of humid heat, of tropical jungle, few settlements, and very little commercial production. Much of the area is scarcely known: parts, in fact, have probably not been explored by white men. The first serious attempt to open up the Oriente was made in 1948, when petroleum prospecting was undertaken and several camps established. The hope that rich oil deposits might or would occur in the Oriente proved illusory. After two years of searching and drilling it was decided, temporarily at any rate, to call a halt: there was not sufficient oil to justify continued exploitation.

So the Oriente continues to remain as it has always been, a thinly peopled area contributing little to the national economy. The few inhabitants of the region, perhaps totalling 30,000-50,000, consist almost exclusively of

tribes of pure-blooded Indians, such as the Jivaros, Auca, and Colorados, who live outside government control. Living in small, scattered, isolated groups, the Indians have had little contact with white people and deliberately shun any attempt to make contact. Some of the Jivaros were employed by the oil company and thereby introduced, if in a casual manner, to western civilisation. Frequently, however, when the Indians have come into contact with white man they have caught, and been decimated by, his diseases. The Jivaros have a reputation as head-hunters, but this unsavoury practice is being abandoned. Formerly when they killed their enemies they decapitated them and then shrank the heads, by means of some secret process, to the size of an apple. The Lowland Indians dwell in rude palm-thatched huts grouped usually near rivers and live by hunting and fishing and a little primitive shifting agriculture. Theirs is essentially a self-sufficient existence.

THE GALAPAGOS ISLANDS

This archipelago, consisting of twelve large islands and several hundred smaller ones, lies some 500 miles west of the coast of Ecuador. The islands, which constitute the Province of Colon, have a total area of about 3000 square miles. There are several extinct volcanic cones. Although the equator passes right through the archipelago, temperatures are reduced slightly due to the cooling effect of the Humboldt Current. The cool current is also responsible for the small rainfall near sea-level. At higher elevations, around 1000 ft, there is sufficient precipitation to support tree growth. The Galapagos Islands are of special scientific interest because of their distinctive flora and fauna. Many species of plants and reptiles are peculiar to the archipelago, e.g. giant tortoises and great lizards.

Albemarle is the largest island, accounting for almost half the total area of the archipelago, but the provincial capital, San Cristobal, is on Chatham Island, which was formerly a convict colony. The total population of the Galapagos Islands is just under 2000. The inhabitants live chiefly by fishing and by collecting and exporting guano and orchilla moss.

ECUADOR'S FUTURE

Summing up, it may be said that Ecuador is small in area and relatively poor in natural resources. On the other hand, she is, according to her present needs, almost self-supporting. But Ecuador has problems of a political, economic, and social nature.

Politically, Ecuador has lacked internal cohesion largely as a result of the effective geographical separation of the three parts of the country but also because of weak, unstable government in the past. This failure to secure effective control over the more remote portions of the national territory has led her more rapacious neighbours to seize large areas of Ecuador. Occupation of her peripheral regions and a more effective and unifying network of communications would help to prevent periodic loss of territory.

Historically the core region of Ecuador has been the plateau peopled by subsistence Indian farmers. It contributes little to the commercial production of the republic. The centre of the country's commercialised agriculture lies in the coastal lowlands. There is thus a need to integrate these two diverse economic entities. The neglect of the Oriente may be attributed in part to the more easily accessible and more readily developed wet tropical coastlands, which are very similar to the interior lowlands. A greater diversity of export crops, improved methods of farming and grazing, expansion of manufacturing industries, and the development of transport and communications are necessary to improve, balance, and stabilise Ecuador's economy.

Finally, the large body of illiterate, depressed, and poverty-stricken Indians must be educated and revitalised so that they can play an active and useful part in the running and development of the country. Dour, indifferent, and backward they may well be at present, but, as has been proved, given help, leadership, and education, they are capable of responding well to such stimuli. The integration of the Indians into the community is a difficult but by no means insuperable task, and is, moreover, essential for the future well-being of Ecuador.

PERU

The Republic of Peru is one of the larger countries of Latin America. In South America it is the third largest state in size. With an area of 482,250 square miles, it is three times the size of California. Situated on the west coast of the continent with a coastline some 1500 miles long and straddling the Andes, Peru has five neighbours—Ecuador, Colombia, Brazil, Bolivia, and Chile. Her relations with her neighbours have not always been friendly. Peru's northern frontier with Ecuador has been disputed for over a century and is still not settled to mutual satisfaction. The present boundary with Chile to the south was not agreed upon until 1929. The remaining sections of the frontier—with Colombia to the north-east, with Brazil to the east, and with Bolivia to the south-east—have been fixed as a result of various territorial exchanges and settlements.* Peru, like so many other Latin American countries, has had its share of internal and external political upsets, but her teething troubles would appear to be over and a measure of stability achieved.

HISTORICAL BACKGROUND

In any account of Peru some mention of its historic past is expected. The story is full of interest, but here only the very briefest account can be essayed. Peru, with good reason, has been called "the Egypt of the New World," for here are to be found ruins equal in size and wonder to the famous temples and monuments that lie scattered along the valley of the

* PEARCY, ETZEL G. and Associates, *World Political Geography*. 2nd ed. 1957. New York: Thomas Y. Crowell Co. P. 158.

Nile. The counterparts of Giza, Karnak, and Abu Simbel are the pre-Inca and Inca ruins at Cuzco, Machu-Picchu, and Sacsahuaman. The great temples and fortresses built of massive masoned blocks of andesite and carefully fitted without mortar are among the wonders of the world.

Before the Christian era an early civilisation had arisen in the coastal areas, but the greatest and best known was that of the last native civilisation, the Inca. The Inca civilisation rose towards the end of the eleventh century A.D. in the Cuzco basin. It freely borrowed from the earlier Peruvian cultures, which had attained a high degree of competence and artistry in architecture, the working of metals, the making of ceramics, and the weaving of textiles. But, though the Incas worked metals, they never smelted iron, and though they constructed roads, they do not appear to have devised the wheel. By the thirteenth century the Inca empire had begun to expand, first southwards into present-day Bolivia and later along the Pacific coast until finally, in the fifteenth century, northern Ecuador was incorporated in the extensive Inca domain.

The Inca Empire was a superbly organised civilisation. "Their political organization was simple but effective. The family, and not the individual, was the unit. Families were grouped in unities of 10, 100, 500, 1000, 10,000 and 40,000, each group with a leader responsible to the next largest group. The Sapa Inca [the absolute ruler who was vice-regent on earth of the Sun God] crowned the political edifice; his four immediate counsellors were those to whom had been allotted responsibility for the northern, southern, eastern and western areas of the empire."* This organisation facilitated a form of communism. Each family was given land, but a proportion of the agricultural output went to the State. Similarly, each family had to devote part of its time to the service of the State, e.g. in the armed forces, the building of roads, in stone-cutting, etc. This tradition of community life and service has lingered on through the centuries to this very day, for the village community is still the essential political and social unit.

Ultimately the Inca Empire grew too large and unwieldy to be effectively controlled from one centre, and the last of the great Inca emperors divided his vast territories between his two sons. These two Inca half-brothers quarrelled over who was the rightful heir. While they were thus engaged, a Spanish adventurer, Francisco Pizarro, lured by rumours of the rich stores of Inca gold and silver, made his way to Peru. Playing off the Inca leaders one against another, he quickly undermined any prospect of concerted resistance, and the empire fell an easy prey to the conquering Spaniards.

The Viceroyalty of Peru was established, and for nearly 300 years the Inca territories were placed under the Spanish colonial system. In the hope of securing quick riches, thousands of Spaniards flocked to Peru. The descendants of these early immigrants account very largely for the European element in Peru's present-day population. Spanish rule con-

* *The South American Handbook*. 1967. P. 407.

tinued until 1821, when the War of Liberation began. Peruvian independence was proclaimed and achieved. Freedom, however, did not bring peace and justice. For a hundred years there was political turmoil, with revolution following revolution. During more recent decades, however, a new and more stable Peru had gradually emerged.

THE PHYSICAL BACKGROUND

Peru is a country of complex and contrasting conditions, but three major natural divisions can be distinguished: the Coastal Desert, the Andean Sierra, and the Eastern Lowlands. The whole of Peru's western seaboard, where the coastal lowlands vary between 10 and 100 miles wide, is desert on which rain rarely falls. Except in the extreme north, where there is slight rainfall each year, the coastal belt suffers from extreme aridity. The arid waste, however, is crossed by dozens of small streams which flow from the slopes of the Andes and bring water which is used to irrigate the parched soils.

From the Pacific coastal strip the Andes rise up sharply to the Sierra. The Andes, 200–250 miles wide, trend in a roughly north-west to south-east direction throughout the country and occupy almost one-third of Peru. The Sierra region consists of a rather confused topographic pattern of mountain ranges, high basins, and deep valleys; the spacious plateaus, such as are found in neighbouring Bolivia, do not materialise in Peru. The average level of the Sierra is 13,000 ft, but many mountains reach 20,000 ft. Temperatures and rainfall vary as much as, and because of, the surface features: the higher mountains are cold and carry snow; the high basins are cool with about 25–40 in. of rain; while the deep, sheltered valleys have sub-tropical temperatures and are relatively dry.

The Montaña Region of eastern Peru comprises about 60% of the country's area. In reality the region, like the corresponding one in Ecuador, consists of two clearly distinguishable parts: the deep, forested valleys of the eastern slopes of the Andes and the level Amazon plains beyond covered with forest and jungle. The montaña is a land of great heat and humidity, of dense, proliferating vegetation, and numerous sluggish rivers. For long remote and isolated, inhabited only by a thinly scattered aboriginal population, this area of enormous potential is now beginning to receive official attention.

This brief outline of the physical conditions makes one thing abundantly clear: Peru is a land of great, and often sharp, contrasts. Most of the Latin American countries can show a wide variety of natural conditions, but none exhibits such varied extremes as Peru: barren desert, icy mountains, sweltering selva, bleak plateaus, and sub-tropical valleys are all represented.

THE PEOPLE

In 1966 the population of Peru was 12,012,000. The current rate of population increase is high, and since 1940 the numbers have increased by over 5 million—a rapid and rather startling increase.

Of the present-day population about 12% are of European, mainly Spanish, origin. Approximately one-third is mestizo—half-breeds of European and Indian forbears—although most of the mestizos are strongly Indian. About half the total population is Indian, of which there are two main groups, the Aymara-speaking people in the south and the Quechua-speaking people in the east. In addition, there is an unknown number, estimated at some 350,000, of Chunchos, a blanket name commonly used to embrace the fifty or so different tribes of uncivilised and semi-civilised people who dwell in the forests of eastern Peru. Some 5% are Asiatics—mainly Chinese or Japanese—and Negroes.

Spanish is the official language, but the native Indians and the mestizos usually speak aboriginal tongues, either Aymara or Quechua. In general, Spanish is spoken in the towns and is taught in the schools, Aymara or Quechua in the Sierra, while the jungle Indians speak their own tribal languages.

In a broad way five social groups may be distinguished in Peru; unfortunately they tend to be mutually exclusive.* (1) A small upper class of European ancestry, pure-blooded Spaniards, who have long been the élite of the country and formed the governing class. Originally land-owners, some have found careers and power in the armed forces, while more recently others have entered the fields of industry and commerce, for the old idea that to engage in trade was undignified has disappeared. (2) The development of education, intellectual life, and social security as well as commerce has led to the emergence of a vigorous middle class comprising teachers, journalists, business-men, and governmental officials. It is on this group that Peru's future progress will very largely depend. As a group, however, it is still numerically small. (3) With the development of industry and manufacture a working-class element, employed in factories, workshops, and other small-scale enterprises and dwelling in urban centres, has gradually materialised. The working class is characteristically socialist and trade unionist and primarily concerned with the benefits accruing to it from social-security and labour-legislation measures. (4) Some two-thirds of the Peruvians are engaged in agriculture. The peasant farmers are predominantly mestizo; they suffer a lower standard of living than the town workers and have been crippled in the past by reactionary rule and economic difficulties. They look for agrarian reform and the redistribution of the land. (5) Finally, there are the Indians, dour, uncommunicative, and, seemingly, indifferent. Most of them live a self-sufficient existence by subsistence farming and herding or, in smaller numbers, they are engaged in mining. The lot of the Indians is not a very happy one, but as a body they are not vocal, and apart from the *Apra* movement (*Alianza Popular Revolucionaria Americana*) have given no real support to any political group.

Peru thus possesses a variegated social pattern. The Spanish minority,

* Based on John Brown's account of Peru in *The British Survey*, Main Series no. 34, January 1952.

though small, is rich and influential. At the other end of the social scale is the great mass of the Indians, chiefly dwelling in the Sierra, who are poor, frugal, apparently lacking in spirit, and politically of no consequence. In between are the middle-, working-, and peasant-class groups, into whose hands power is gradually falling. As industry develops and towns grow, so will the social and political pattern change. At present there are relatively few sizeable towns in Peru: only about half a dozen have more than 50,000 people. Lima, the capital, by contrast, is a metropolis of over a million inhabitants, and plays a dominant part by the life of the country, being the unchallenged political, economic, and intellectual focus of Peru.

THE ECONOMY

Agriculture and mining are the principal activities, crops and minerals the basis of the economy. Of the gainfully employed population, numbering nearly 4 millions, about $2\frac{1}{4}$ millions of them are engaged in agricultural and pastoral work. Although farming is so important, only 1.4%—just over 4 million acres—is classed as arable and orchard land. Steps are now being taken to increase the area of cultivable land by extending irrigation and clearing forest. A very wide variety of crops is grown, among them maize, wheat, barley, quinoa, rice, manioc, potatoes, vegetables, fruits of many kinds, sugar-cane, coffee, coca, and cotton. Sugar and cotton are the chief cash crops.

The most important single item in the Peruvian diet is the potato, of which nearly $1\frac{1}{2}$ million metric tons are produced annually, sufficient to satisfy national needs. Enough maize, or choclo, quinoa and barley, and manioc, or yucca—all staple Indian foodstuffs—are grown to meet requirements. Even so, Peru is not completely self-supporting in foodstuffs and grows only about 10% of the wheat she needs. Agricultural production has increased by 50% during the past quarter of a century, but this increased output has been offset by the growth in population. Recently there has been a notable development in rice cultivation and a greater concentration upon wheat and barley production.

About 800,000 metric tons of sugar are produced from some 160,000 acres under cane. Approximately two-thirds are exported, the remainder meets domestic requirements and is used in the making of spirits and liqueurs. The industry has the reputation of being the most efficient sugar industry in the world. Cotton, which like sugar comes from the irrigated lands of the Pacific coastlands, enjoys a high reputation, and the very white, long-stapled Tangüis variety is greatly esteemed. The yield from some 560,000 acres averages about 400,000 metric tons a year. About 60,000 metric tons of coffee are produced. Small, but increasing, quantities of cacao, tea, and tobacco are being grown; the latter is a government monopoly. A crop of long-standing cultivation is coca, from which the drug cocaine is extracted. The chewing of coca leaf is a universal habit among the Indians.

Herding is an important occupation in many parts of Peru, chiefly in

the highlands. Altogether there are about 28 million livestock. Estimated numbers are:

| | |
|----------------------------------|------------|
| Cattle | 3,412,000 |
| Sheep | 16,190,000 |
| Goats | 2,283,000 |
| Llamas, alpacas etc. | 3,388,000 |
| Pigs | 1,346,000 |
| Horses, donkeys, mules | 1,687,000 |
| Chickens | 11,621,000 |

The cattle industry, mainly located in the highlands, is small and by no means large enough to supply the country's needs of beef and dairy produce. Sheep are reared principally in southern Peru and produce about 10,000 metric tons of wool annually, the bulk of which is used internally. On the high, wind-swept *punas* are grazed llamas, which are chiefly beasts of burden, and alpacas, vicunas, and huarizos, which are raised for their hair, most of which is exported. In 1962 just over 4000 metric tons were exported. All these animals of the llama family are native to Peru. The huarizo is a cross between a llama and an alpaca, with the former as sire.

A recent development is the fishing industry, which is now the world's largest. Catches have grown by leaps and bounds, and currently are around 9 million tons, four-fifths being exported. There are rich fishing grounds offshore, containing tunny, bonito, mackerel, and sea bass. Over seventy canneries already process the catch. At Tierra Colorada has been established one of the world's largest whaling stations. Fish products now represent the largest percentage of Peru's export earnings.

Although 56% of the country is classed as forest and woodland, the great forest resources are little exploited. 250,000 square miles of forest, rich in mahogany, balsa, cedar, and innumerable species of tropical hardwoods, lie in eastern Peru, but isolation and transport difficulties have prevented any significant development. An American firm holds a concession to exploit the forest. There are some exports of hardwood from Iquitos, which is a saw-milling centre. This river town is also the collecting and distributing point for the trade in other forest products, such as rubber and balata, tagua nuts, barbasco root, used in the preparation of insecticides, and various medicinal plants.

Peru is rich in mineral wealth and is one of the leading world producers of silver, lead, zinc, copper, bismuth, vanadium, and antimony. She also possesses large deposits of iron ore, recently developed, and there is petroleum in northern coastal Peru and in the Amazon basin. Deposits of guano, an organic fertiliser derived from bird-droppings, once exported in large quantities but now becoming exhausted, occur on islands off the coast. A fuller account of Peru's mineral wealth is given on page 283.

Industrial development is still on a small scale, although in recent years there has been much progress. In the past manufacturing has been greatly handicapped by foreign competition and by the low purchasing power of

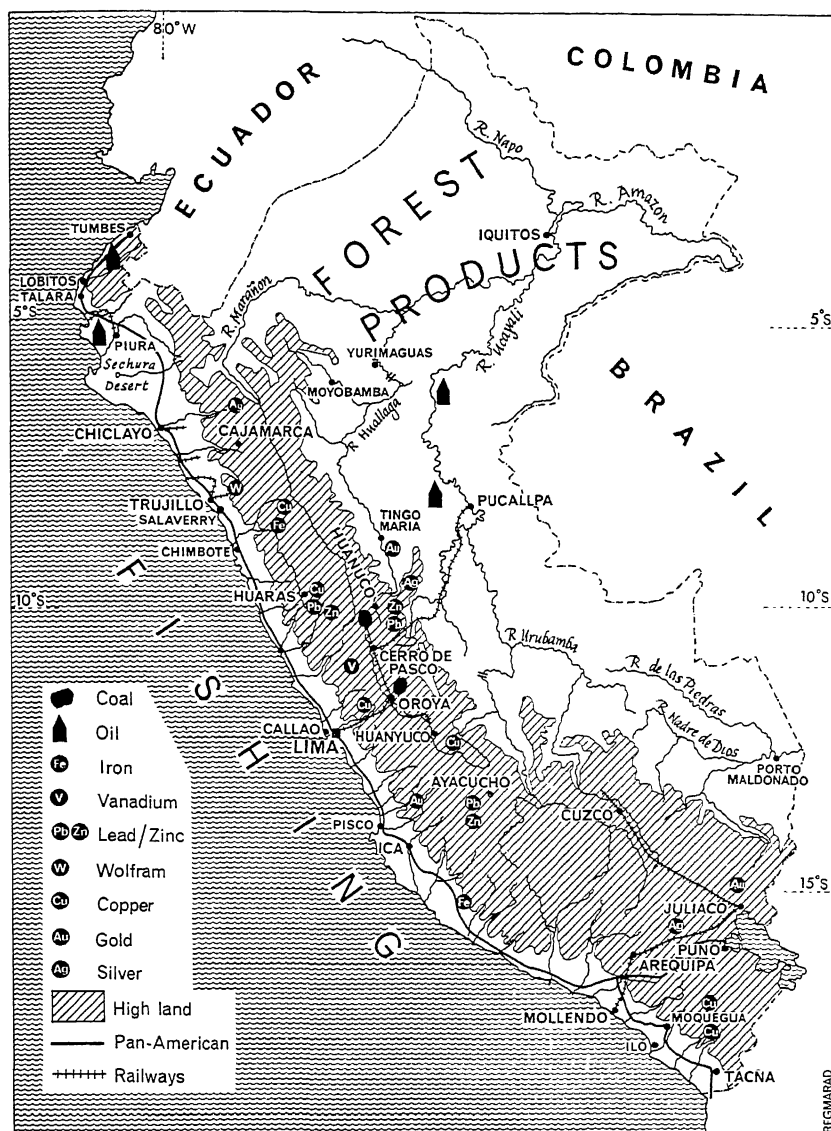


FIG. 78.—Peru: general features.

the people. Assistance to industry has been given by raising high tariffs and by the provision of electric power. The emphasis at the present day is upon an increasing measure of industrialisation and national self-sufficiency, hence many new industries, manned and run and owned by Peruvians, have been set up. Apart from metal smelteries and the oil refineries, mainly owned by foreign companies, and the new Peruvian steel industry at Chimbote, the manufacturing industries are chiefly concerned

with the production of commodities and articles in general demand easily made from raw materials obtained within the country, *e.g.* textiles (the most important of these industries), footwear, paper, furniture, soap, plastic goods, paint, glassware, foodstuffs, and drink.

Summing up, it may be said that Peru possesses the bases for a sound and well-balanced economy: there is plenty of land, albeit in the east, for agricultural expansion; there are possibilities of expanding the pastoral industry, more particularly through the cultivation of suitable forage crops; there is a virtually untapped wealth of forest resources and room for a greater expansion of the already productive fisheries; there are vast stores of mineral wealth and possibly further rich deposits of oil; and there are potential sources of power which will go far to meeting Peru's needs in the foreseeable future. The chief obstacles to economic development and increased prosperity are lack of capital for development projects (although since the end of the Second World War several large-scale projects have been launched with the aid of foreign investment), poor communications, and the large proportion of uneducated and conservative Indians.

LAND TENURE AND AGRICULTURAL SYSTEMS

After the Spanish conquest grants of land were given by the Crown to the adventurers who settled in Peru. Large private estates, or *haciendas*, thus came into being; at the same time the new landed class became the new aristocracy. To this day much of the land is held in large estates, many of them dating from the sixteenth and seventeenth centuries. Estates of 5000 acres and more are not uncommon. In the early days possession of land by itself was practically valueless; only where there was labour available to work the land did it have real value. As Preston James puts it: "the ownership of land which brought prestige did not also bring economic security to the owner unless that land included a supply of Indian workers, for under the Spanish system production of any sort, whether in the mines or on the fields, was dependent on the labour of the native peoples."* Hence many of the Indians became estate workers and their descendants continue to toil as farm labourers. The labourers today mostly live on the estates; usually they are provided with a patch of land which they cultivate themselves in addition to receiving payment for the work they do on the haciendas. The Indians who lived in the more remote and inaccessible areas remained outside the hacienda system and continued to cultivate the land in the traditional way, *i.e.* the village community or *ayllu* system. Thus, to quote James again, "two contrasted systems of land tenure—the traditional communal system of the Indians and the system of private property introduced by the Spaniards—continue to exist together in the same area."† The failure of successive governments during recent years to carry out a redistribution of the land is a source of much bitterness among the peasantry.

* *Latin America*, p. 167.

† *Idem*.

Some authorities hold that the present-day cultivated area of 4.3 million acres is probably less than was cultivated in Inca times. In Incaic days the sloping valley sides were terraced to increase the area of arable land—these terraces or *andenes* can still be seen—while engineers constructed aqueducts so that the water supply could be controlled. Unfortunately both the hillside terraces and the water works fell into disuse after the conquest. The intensive methods of cultivation developed by the Incas stand contrasted with the inefficient techniques employed by the present-day Indian cultivators. Although the Government during more recent years has made genuine efforts to introduce more efficient methods of farming, the Indians have shown little response.

It is interesting and heartening to learn that recent efforts by the United Nations Organisation have met with greater success, as they have also in the adjacent republic of Bolivia. While crude and old-fashioned methods of cultivation characterise the small-holdings of the peasants and, more particularly, the Indian subsistence farms, modern techniques are used on some of the big estates. Worthy of note is the fact that the irrigated coastal strips, though totalling only some 1,350,000 acres or about 30% of the cultivated area, produce nearly half of the total agricultural output of Peru. The irrigated coastlands, moreover, account for almost all the agricultural exports. The Peruvian Highlands, on the other hand, yield virtually nothing for the export trade, most of the products being consumed locally.

MINERAL WEALTH

The Spaniards were lured to Peru by the promise of mineral riches, and from the earliest days of Spanish settlement the mines of Peru have been famous. Minerals are still the chief exports, accounting, in 1962, for 44.0% by value of the export trade. Valuable as they are from the point of view of foreign-exchange earnings, agricultural products are of greater significance to the internal economy. Many of the mines and most of the oil-wells are in the hands of foreign concerns, and many Peruvians have complained that it is the foreigners and not they who reap the harvest of the country's mineral riches. But the notion that "foreign capitalists are skimming the cream" is a narrow and unrealistic attitude of mind, for Peru does not possess the capital resources necessary to exploit these resources herself, and without foreign investment and technical skill Peru's modern progress would have been very seriously retarded. The nation's leaders fortunately realised this, and in 1950 a generous Mining Code was passed, which has resulted in attracting necessary foreign capital.

Petroleum. Oil is the most valuable mineral produced. Peru is the sixth largest producer in Latin America. The most important field is in the northern coastal area near the Ecuadorean border, where the International Petroleum Company (IPC) operate the La Brea-Parinas fields at Talara and Negritos. Discovered as far back as 1888, the fields are still yielding

well, and produce about 28,000 barrels daily. Other fields in this locality are those of Zorritos, first drilled as long ago as 1863 but now almost used up, and the new adjacent Los Organos field, both of which are government owned; and the British-owned Lobitos fields, worked at Lobitos and Cabo Restin, which are the second most productive oilfields. These old oil-wells of northern Peru have been intensively developed and have shown a remarkably stable output. During recent times drilling has taken place in the Sechura Desert to the south, but with little success.

The continued disappointing results in the Sechura Desert have led to increasing attention being paid to exploration in the Montaña region, east of the Andes. This region, though comparatively inaccessible and handicapped by difficult natural conditions, already has more than 35 million acres under concession. Although there are oil seepages in many parts of the selvas of the Amazon basin and although much drilling is in progress, so far only two fields have been located: the first is the Ganzo Azul dome, near Agua Caliente, discovered in 1938 and American owned and, the second, two wells east of Contamana owned by *Peruana de Petrolera*.

Annual oil production is about 3 million tons. A couple of decades or so ago the bulk of the petroleum produced was exported, since the domestic demand was relatively small. Today the picture has changed: with the sharp rise in domestic consumption, which now absorbs over 75% of the total production, exports are decreasing.

Metals. One of the richest metalliferous areas in the world occurs in the Peruvian Andes, and the republic produces a wide variety of metallic products. Lead, zinc, copper, silver, and iron are the most important, and together account for about 40% by value of the total exports. Other metals produced in comparatively small quantities are antimony, tungsten, tin, gold, bismuth, manganese, molybdenum, and vanadium. Peru possesses one of the largest vanadium mines in the world, and a quarter of the total world output comes from the deposit at Minaragra west of Cerro de Pasco. Peru is also the world's foremost producer of bismuth.

Most of the Peruvian ore bodies are complex: in general, they are mixed deposits containing several different metals, usually lead, zinc, silver, copper, and sometimes gold, together with smaller quantities of other metals of lesser importance. Cerro de Pasco, one of the oldest mining centres in the Americas, produces a variety of metals. Originally worked for silver, the Cerro de Pasco ore body was later mined for copper; nowadays lead production is more important than copper. Other localities have a similar assemblage of minerals; indeed, there are few deposits producing only a single metal. The occurrence of complex ores of this kind has meant that the selective flotation process has had to be employed. Commonly, therefore, concentrating, smelting, and refining plants are associated with the actual mines. "From its complex ores the CPC (Cerro de Pasco Corporation) produces at Oroya, refined silver, refined lead in ingots and sheets, refined copper, refined antimony in ingots, refined zinc

in bars and sheets, calcium carbide, sulphuric acid, arsenic, bismuth, arsenate of calcium, and sulphate of zinc."^{*}

Two recent developments deserve special mention. In the department of Ica a vast reserve of iron ore—estimated at 100 million tons with an iron content of up to 62%—was discovered; moreover, the overburden everywhere was less than 20 ft thick so that it could be easily quarried. Even so, this rich reserve had to wait for foreign capital before exploitation could begin. In 1952, however, the Marcona Mining Company, a United States concern, was granted a 600 sq. km. concession and has invested several million dollars in the undertaking. By 1957 the iron-ore output had reached $3\frac{1}{2}$ million tons, but has scarcely increased since that date.

The second development concerns the Toquepala copper deposits in southern Peru. Here, to the south of the town of Moquegua, and also at Quellaveco to the east of Moquegua, lie vast stores of copper ore. All told, there is an estimated 600 million tons of 1% copper ore. The capital required to develop these deposits runs to the tune of \$200 million. Investment of this order is beyond Peru's resources, but the Export-Import Bank of the United States has granted (1954) half this sum. A new town, a new port, and new roads and railways will emerge as this development of the Toquepala copper deposits takes shape. The Southern Peru Mining Company is already developing this copper property, and it is estimated that 140,000 tons of copper will eventually be exported each year. The project, when completed, will be the largest single mining concern in the republic.

COMMUNICATIONS

Although there have been important developments in Peru's communications system during the past quarter of a century, transport, especially overland transport, is still very inadequate. Economic expansion is very largely tied up with communications, and the lack of these is likely to handicap the republic's expansion.

Peru possesses some 30,000 miles of roads, but a high proportion of this mileage consists of unsurfaced roadway. There are two main highways. The Pan-American Highway runs from Aguas Verdes near the Ecuadorian frontier to Arequipa in the south and provides the principal means of communication in the coastal region. Most of it is asphalted and much of it has been improved. The increasing road traffic is necessitating reconstruction, widening, and better maintenance. The Central Trans-andean Highway from Lima to Cerro de Pasco was completed in 1935, and the extension to Pucallpa was opened in 1944. The 330-mile length, of road between Cerro de Pasco and Pucallpa has not yet been metalled and during the rainy months it is impassable. There is still no road down the Marañón beyond Bellavista, though a highway is projected to Porto

* *South American Handbook*. 1960. P. 559.

Melendez. Another highway, already marked out by a trail, is proposed which will continue the road from Cajamarca via Moyabamba to Yurimaguas in the Peruvian selva.

The first railway was opened in 1850. Today there are 2750 miles of track, largely foreign-built and foreign-owned. Government lines account for about 600 miles, the Peruvian Corporation for over 1000, and private enterprises for about 700. The Central Railway, which is the highest broad-gauge railway line in the world, was built by the United States and runs from Callao on the coast eastwards, via Lima, across the extremely rugged terrain of the Western Cordillera (where the line reaches 16,000 ft) to Oroya, the mining and smelting town in the Central Sierra region. From Oroya a branch runs northwards to Cerro de Pasco so that ores can be moved to the coast, while a southern branch goes to Huanavelica, 74 miles distant. There are plans to extend the line southwards to Cuzco. A new extension, at present under construction, will run from Tambo del Sol on the Oroya-Cerro de Pasco line eastwards to Oxapampa and thence northwards, paralleling the Pachilea River to Pucallpa. When this is completed the coast of Peru will be connected for the first time with the navigable waterways of eastern Peru; the railway will open up areas in the Montaña region for colonisation, serve the Le Tourneau Concession, a colonising experiment already under way, and make possible the transport of forest products and tropical produce to Lima for consumption or to Callao for export.

From the port of Mollendo in southern Peru the Southern Railway, operated by a British Company, runs inland to Arequipa and thence eastwards to Juliaca. From the latter town a branch traverses the river valley northwards to Cuzco and beyond, Huadquina being the present terminus; southwards from Juliaca a short 30-mile line runs to Puno on the north-western shore of Lake Titicaca. The same British Company operates scheduled steamer services across the lake from Puno to Guaqui in Bolivia. Lake traffic, however, is slight.

In addition to these main lines ten short stretches of railway penetrate inland from the coast to tap the oasis settlements of the Peruvian desert. The most recent of these railways is the newly built 114-mile line from the port of Ilo to the recently developed copper deposits at Toquepala.

The most startling developments in communications, however, have been in the realm of air transport. Peru, like many other Latin American countries, has realised the value of the aeroplane. Internal air services link together towns which lie far apart and which cannot easily be reached; for example, the distance between Lima in the coastal belt and Iquitos in the Amazon basin is 1200 miles, and the overland journey by rail, road, and river takes three weeks: the same distance can now be undertaken by air in a few hours. Great distances and difficult terrain have done much to stimulate the use of air communications and transport. Considerable quantities of goods as well as passengers are nowadays transported by air. Some commodities, such as heavy, bulky goods, cannot normally be car-

ried by air, and the Government still ships supplies of a bulky nature from Callao to Iquitos via the Panamá Canal and the Amazon.

Apart from a few trails and the air services, transport in eastern Peru is by river. There are river-steamer services on the Ucayali and Huallaga rivers. There is also coastwise shipping from port to port along the Pacific coast, though services are irregular and travel is slow.

PERU: REGIONS (Fig. 79)

THE PACIFIC COASTLANDS

The arid coastal strip extends the entire length of the country from Ecuador in the north to Chile in the south, a distance of some 1500 miles. The region consists of a low plain in the north, nowhere more than a

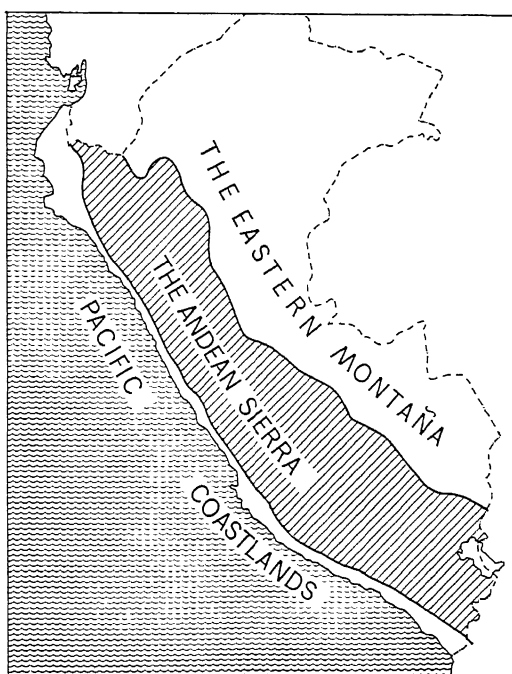


FIG. 79.—Peru: regions.

hundred miles wide, which gradually narrows southwards until it disappears altogether in the vicinity of the town of Trujillo; next, south of the mouth of the Santa River as far as, approximately, the River Ica, is a 600-mile belt where river valleys alternate with spurs projecting from the Andes and terminating in blunt headlands; and, finally, beyond about 15 degrees S., the coast becomes increasingly rugged as ranges rise sharply from the sea and extend their rocky terrain inland for distances of 20–40 miles to the base of the Andes. The entire coastal belt covers slightly more

than one-tenth of the total national area, but here live 27% of the population.

The coastal region is mostly desert. There is a little rainfall in the extreme north, but elsewhere it is almost completely arid; in many areas no rain has fallen for years. The prevailing onshore winds blow over the cold waters carried equatorwards by the Humboldt Current, and so pick up little moisture. When the winds reach the land they are warmed and so absorb moisture rather than yield rain. Between June and October, however, some condensation does occur to produce cloud and mist over the southern half of the coastal belt. This blanket of sea-mist, known as *garua*, dampens a narrow zone along the Andean slopes sufficiently to permit the growth of grass, and these seasonal pastures, or *lomas* as they are called, provide grazing land for Sierra livestock which are driven down

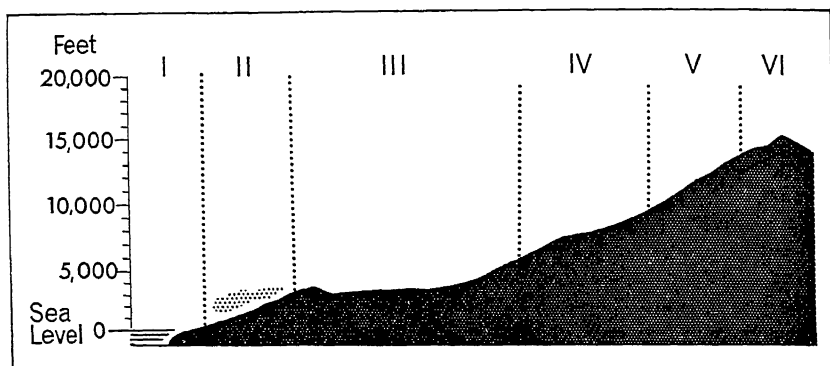


FIG. 80.—In this generalised diagram of the coastlands of Peru (I) is the littoral where rain may fall once in several years, (II) is the zone of mist-covered coastal mountain slopes, (III) is the arid desert zone, (IV) is a belt of slight but annual rains, and (V) is the zone of fairly abundant rainfall, 60–70 in. [After Isaiah Bowman.]

from the mountains. Because of this persistent mist, temperatures are kept down, and Lima, about 8 miles inland, remains cool: the mean summer temperature is 66° F (18° C), the winter 59° F (15° C). Occasionally, in the far north, warm water moves southwards over the cold offshore water, and when this happens surface temperatures rise, evaporation is accelerated, and torrential rains deluge the desert. But these sudden rainstorms, which wreak great destruction, occur only at rare intervals.

Almost the entire coastal region would be a narrow ribbon of barren wasteland but for the sequence of parallel streams which flow down the western slopes of the Andes. Fifty-two small rivers, few of which actually reach the sea, bring life-giving water to the desert. Irrigation is made possible in some forty "oases" which are distributed intermittently along the entire stretch of coast (Fig. 82). The snow-fed mountain streams begin to flood in November at the beginning of the summer season and provide water until about June; after that time the majority begin to dry up,

only about ten channels having water in their beds the year through. The Incas over four centuries ago developed a magnificent system of irrigation, but this was allowed to languish during the Colonial Era, and it is only during recent decades that irrigation agriculture has been revived and expanded. Today some 1,350,000 acres are under irrigation. Almost every valley has been turned into a "little Egypt," and the area under irrigation is now being constantly expanded.

Even so, there are still arid areas capable of being redeemed and there are several schemes planned or in process of completion. Two are worth noting. Plans have been made to reclaim nearly 150,000 acres of desert land in Northern Peru by constructing a reservoir in the Chancay valley of the department of Lambayeque. The scheme would also provide an adequate all-the-year-round water supply for some 40,000 acres already under cultivation but subject to periodic droughts. It is proposed to construct the dam at Tinajones. The project involves the diversion of part of the flow of the Chotano River from the Amazon to the Chancay.

The second project involves the irrigation of the Pampas De Olmos, in the northern part of the Lambayeque department. This, if completed, would reclaim over 370,000 acres of desert land and benefit a further 75,000 acres already cropped. In addition, the scheme would provide hydro-electric power with an estimated capacity of 250,000 kW for rural electrification and industry. Reconnaissance studies are already being made under the auspices of the World Food and Agricultural Organisation.

While some of these oases are given over to plantations, usually specialising in the commercial production of cotton and sugar, others are devoted more especially to subsistence agriculture. In northern Peru there are three great oases, those of Piura, Chiclayo, and Trujillo. The two former oases, between them, grow 75% of the total Peruvian rice production. The Trujillo oasis, which comprises two distinct irrigated areas, the one to the north, the other to the south of the town of Trujillo, has large estates devoted to the large-scale cultivation of sugar-cane and just over half of all Peruvian sugar comes from this area. The Chicama Valley, 27 miles long, is known as the "Peruvian sugar-bowl." In the valley is the Hacienda Cartavio, covering 15,000 acres and employing 4000 labourers, which is well known throughout Peru. The town of Trujillo (118,000), now the fourth largest city in the country, lies a few miles inland, but is served by the port of Salaverry, which is being expanded. Just outside Trujillo are the extensive crumbling remains of Chan-Chan, the ancient capital city of the Chimú Empire, which was conquered by the Incas about A.D. 1400.

Between the oases of Chiclayo and Piura lies the Desert of Sechura, where unsuccessful oil drilling has taken place. The area around Piura formerly had uncertain water supplies, but now, thanks to the Quiroz irrigation scheme, water is carried by pipe from the headwaters of the Amazon through the mountains. In addition, the San Lorenzo dam has

made possible the utilisation of another 100,000 acres of desert. North of Piura, in the hot, parched, tawny desert, lie the petroleum deposits of northern Peru. Talara (41,000) is the chief centre of the oil industry, with a great refinery and important oil-shipping trade.

The Pan-American Highway, which runs along the coast after crossing the Ecuadorean frontier, swings inland to Piura and then skirts the Sechura Desert to the east as it goes to Chiclayo. Once again it keeps fairly close to the coast as it proceeds southwards to Trujillo and beyond to the capital. Not far south of Trujillo is Chimbote (65,000), a small port with a good natural harbour, which has become the site of Peru's new iron and steel industry, started in 1958. The port was improved in 1945 to handle coal mined in the Santa valley and to import Marcona iron ore. The Canon del Pato hydro-electric project on the Santa River provides power for the Chimbote plant.

From the date of its founding in 1935, Lima was the capital of Spanish South America. In its palmy days it was an opulent city, and its fine churches and handsome colonial buildings bear eloquent testimony to its former riches and splendour. Side by side with these beautiful buildings are modern skyscrapers, for present-day Lima is a rapidly growing and burgeoning city, ranking number six among Latin American cities. Lima is situated about 7 miles inland from the port of Callao (161,000), with which it is closely linked. The capital is built on a plain which slopes gently down to the sea and astride the Río Rimac, which crosses this plain; behind the city rise the Andes, forming a magnificent backcloth. With a population of 1,730,000, Lima is the focus of the political, economic, educational, and social life of the entire country. It is also an important and growing industrial centre. The metropolis is served by Callao, which handles about three-quarters of the country's imports and a quarter of its exports. Callao is naturally merely an open roadstead partially protected by the offshore island of San Lorenzo. But a breakwater has been built to enclose a 250-acre harbour equipped with piers and docks and modern loading and discharging facilities. Callao, besides being a busy port, is an important commercial town with growing industries.

South of Lima the mountains begin to crowd in and the coastal plain as such disappears. More ribbon oases occur, often with small ports, which are also fishing centres, at the mouths of the rivers. From Lima to Ica cotton, sugar, and vines are grown together with market-garden produce, which finds a ready market in Lima and Callao. Just to the north of Ica there has been drilling for oil, but so far none has been found. South of Ica, a town of some 38,000 people with textile mills and wineries, the coastal topography becomes more difficult and the little valleys have only restricted areas suitable for cultivation. The two most important oases are those in the valleys of the Rivers Chili and Moquegua. The town of Arequipa (156,000), is the third city of Peru. It is a busy commercial centre, wool market and textile manufacturing town. Mollendo, a poorly

protected open roadstead, and the newer Matarani serve Arequipa. Most of the southern oases, however, are thin ribbons of cultivated land producing little other than a subsistence livelihood for the oasis dwellers.

Before concluding this account of the Coastal Desert reference should be made to the guano deposits on the Chincha Islands. This guano is, writes Peter Schmid,* "the most famous manure in world history, manure that made possible a civilization. Without this guano the Incas would not have been able to feed their people and the crumbs of soil on their mountain slopes would have produced no harvests. . . . Before mineshafts were sunk in her mountains and oil wells in her desert Peru's entire economy was built on this manure, which seemed to be an almost inexhaustible source of export wealth. Today, however, the reserves have almost disappeared and the guano company, which is controlled by the government, can only spare 150,000 tons a year for agriculture." The guano is the accumulated excrement of tens of millions of birds. "And they are treated with respect, I might almost say with reverence. . . . No aircraft may approach with the drone of its engine, no ship may blow its siren and no hunter can fire at them. For in these cases the flock would rise in the air in terror and their coveted excrement would fall in the sea.

"All this creates a huge causal chain: the desert on the coast, the Humboldt river, the Arctic cool near the Equator. Thus the coast of Ecuador where it curves on the Pacific is a burning hell, and the desert extends here because the damp air above the cold water is condensed to fog—a fog which never throughout the whole year turns to fertilizing rain. The Humboldt river provides the birds with their food. Countless millions of anchovies live on the microscopic plankton which it carries down, and they in turn disappear into the hungry bellies of the sea birds. Sometimes a mysterious cyclic condition brings about a catastrophe among the anchovies. About every ten years, for some undiscovered reason, the temperature of the Humboldt rises and kills off all the plankton. Then the anchovies starve and as a result the guano birds also hunger and die. The last of these catastrophes happened in 1951 and 100,000 precious birds died in their white islands. The anchovies have still not reached their former number. Possibly not only nature but man was responsible for this. The guano birds have found a competitor, the fish nitrate industry, which sends its products to the poultry and pig farmers in the United States in exchange for good dollars. The guano administration is far from pleased at this competition and the Peruvian government is faced with an almost philosophical problem: should the anchovies be digested or pulverized in order to give the greatest return?"

THE ANDEAN SIERRA

Peru's second region is the Sierra, the name given to the high ranges, together with their intermontane areas, which covers about a third of the

* *Beggars on Golden Stools*. George Weidenfeld & Nicholson Ltd. 1956. Pp. 176-7.

country. Topographically, it is a region of high ridges, towering peaks, high basins, and deep valleys. Several of the high mountains, some of them volcanoes, exceed 20,000 ft; the highest, Huascarán, is 22,334 ft. Between the massive groups of mountain lie high-level basins and plateaus, although the vast plateau areas forming the altiplano of Bolivia are not found in Peru. These plateaus and basins generally have an elevation of 10,000–12,000 ft. Rivers rising in the mountains near the Pacific coast have gouged out deep valleys, sometimes to a depth of 5000 ft, as they have made their way to the Amazon basin. Altogether a somewhat confused and tangled topography characterises the Sierra region.

Climatic conditions vary considerably from place to place. To a very large extent they are a reflection of the relief. The higher mountainous areas, cold and dry, are referred to as the *punas*. Below the snowline the vegetation consists of bunch-grass with scattered low-growing, hairy-leaved plants. The basins and plateaus are cool and rather bleak, but by day it is warm in the sun. These grass-covered depressions are the chief grazing lands of Peru, and herds of sheep, llamas, and alpacas are reared by the Indian pastoralists. They depend upon the flocks not only for the wool which they sell but also for other important necessities, *e.g.* the meat which they eat, the clothes they wear, fuel made from dung, and transport, for the llama serves as a pack-animal and will carry up to, but no more than, 100 lb. These highland Indians, hardy, silent, and dour, are almost completely self-sufficient. Many of the basins, however, are favourable to agriculture, as, for example, the Huancayo and Cuzco basins and the area around Lake Titicaca. In most areas the rainfall is light and variable, although it does coincide with the warmest months of the year when crops are grown. The deep valleys which dissect the Sierra platform frequently have sub-tropical temperatures, but tend to be dry and depend very much, as do many of the basins, upon irrigation for cultivation.

The Sierra contains about 60% of the country's total population, three-quarters of whom are Indians. The concentration of population here has resulted from the general attractiveness of high-altitude areas in tropical latitudes, although the long historical occupation of the highlands and the security that the Sierra offered through their inaccessibility must be reckoned as contributing factors. The population, which is predominantly rural, is scattered and unevenly distributed. Although there are a number of towns, usually with populations of between about 10,000 and 30,000, the typical settlement is the village, of which there are some 5000. Those who do not live in communal settlements dwell on large haciendas or in mining camps. The few small individual farms that are to be found in the Sierra region usually belong to mestizo farmers.

The Indian villages are collections of thatched or sheeted mud-brick huts generally clustered around a church. Around the mean and dilapidated houses are patches of land devoted to quinoa, potatoes, and vegetables. Cultivation in these village communities is of a most rudimentary

kind: all labour—the tilling, the planting, and the harvesting—is done by hand. Some of the menfolk act as herders, shepherding their flocks of sheep, llamas, and alpacas to the pastures by day and returning with them at sundown, when the animals are penned in walled enclosures for the night. The common garb of the Indian is a *poncho*, *i.e.* a blanket with a hole in the middle through which he puts his head: the blanket is worn over the shoulders like a cape. These blankets are hand-woven, and the pattern tells one the tribe to which the wearer belongs. Headgear commonly consists of a woollen cap with ear flaps. The womenfolk usually wear voluminous skirts and a woollen shawl and a hat which can be best described as a bowler. Almost the only solace these wretched Indians have is their coca, which they chew with lime. Those who are fortunate secure work in the mines, where wages are higher and living conditions better.

In the northern Sierra the chief concentrations of settlement centre upon the towns of Cajamarca, Huaras, and Huanuco. Cajamarca (23,000), which lies at an elevation of 9000 ft, is an old settlement which retains its colonial atmosphere. It is the chief town of the northern section. Huaras (20,000), in the Río Santa valley, is the centre of another well-populated district. Huanuco (24,000), on the upper Huallaga River, is another ancient town, situated at about 6000 ft, which is the hub of a productive farming and mining locality.

The central part of the Sierra is the great mining area of Peru, and to the foreigner the region's greatest economic significance lies, as it has done for over four centuries, in the stores of silver, lead, zinc, copper, and other minerals which are to be found in the mountains. Many of the mines are found at heights of 15,000–17,000 ft. Mining at such elevations presents tremendous handicaps of food and general supplies, transportation, and labour. But for the Indian workers, who are physically adapted to the rarefied air at such great altitudes, the winning of this mineral wealth would be an impossibility. The chief centres in this central sector are Cerro de Pasco, Oroya, and Huancayo. Cerro de Pasco (20,000), long famed for its silver, is now more important for copper, lead, and zinc. It continues to function as Peru's greatest centre of mining. Smelting of the ores is also carried on here with coal brought from Goyllarisquisga 25 miles away, where there is a coal mine reputed to be the highest in the world. Incidentally, a by-product of the smelting is bismuth, which is recovered from the dust in the flues. About 60 miles south of Cerro de Pasco is Oroya "with its smoke-blackened smelters, ugly slag heaps and bleak hills." The town, with a population of about 25,000, is one of the principal smelting and refining centres of the Cerro de Pasco Corporation. Huancayo, south of Oroya, a town of 50,000 inhabitants, situated in a basin of 10,000 ft elevation, is a busy market centre with "picturesque architecture and the best Sunday market in Peru: the Indians flock to it from far and wide with an incredible range of food and rugs and blankets of llama and alpaca wool for sale."*

* *The South American Handbook*. 1967. P. 413.

wheat-growing area producing about 40% of the entire Peruvian wheat crop. Most of it is railed down to Lima, where it finds a good market among the wealthier wheat-eating white people.

Most of the southern part of the Sierra lies at an elevation of 10,000 ft and above. The life and economic activity of the area centres upon pastoralism. The main sheep areas of Peru are found here. The bulk of the wool is sent to Arequipa, which has textile factories. Juliaca (20,000) is the principal collecting centre for wool, skins, and hides; it also possesses several tanneries. Thirty miles south of Juliaca and linked to it by railway is Puno (25,000) on the shores of Lake Titicaca. Puno is the terminal of the lake steamer service to Bolivia. From Juliaca another railway runs northwards to Cuzco (72,000). Cuzco, in a magnificent setting of mountains and pinewoods, was the capital city of the Incas and there are monuments and reminders everywhere of its past history. Not far away is the ruined city of Machu-Picchu. Not surprisingly, Cuzco has become an important tourist centre. The town was shattered by a devastating earthquake in 1950 but the Government has reconstructed the cathedral, the old churches, and many of the historic buildings. In the Cuzco Basin agriculture is important and crop growing is characteristic of the whole valley leading to Juliaca. The level plateau land around the shores of Lake Titicaca is also a productive farming area, but at a height of 12,000 ft the crops are rather limited.

THE EASTERN MONTAÑA

The Montaña region embraces the forested eastern slopes and deep valleys of the Andes and the extensive level plains beyond, which form part of the Amazonian selva. The region covers some 60% of the total area of the country, but only a small proportion, estimated at about 12%, of the population. The Montaña experiences high temperatures and heavy rainfall throughout the year—100 in. and more are common. This abundant precipitation is due to the high rate of evaporation, which induces convection currents and westward-moving air streams which are lifted by the Andes to produce relief rains. The high humidity and sweltering heat give rise to oppressive and enervating climatic conditions which have not been conducive to settlement, therefore the area as a whole is very thinly peopled and there are vast areas having less than one person per square mile.

Climate is not the only factor contributing to the paucity of population and economic backwardness of the Montaña; others, such as disease and inaccessibility, must be taken into account. Diseases such as malaria, yellow fever, and plague, though now much less serious than formerly, complaints such as worm infestation, and practices such as geophagy or earth-eating, have weakened and occasionally decimated the peoples living in the Montaña. Moreover, the region is isolated and very largely cut off from the rest of Peru. Rivers have, until very recently, provided the only means of transport and these have led eastwards—away from, instead of

towards, the country. Yet, in spite of these and other difficulties, Peru, in comparison with Ecuador, whose Oriente region is very similar, has made commendable efforts to develop and colonise the Montaña. New roads, new settlements, oil exploration, experimental farms, etc., are all part and parcel of the endeavour to open up this frontier zone. So far the region contributes relatively little to the Peruvian economy, but its potentialities are enormous. Responsible people are aware of this: hence the attempts to develop and people the region and to integrate it into the national economy. The Montaña may well prove to be Peru's new treasure chest.

The deep, steep-sided valleys of the eastern Andean border possess three main areas of settlement: the first in the north around Moyobamba (5000), which lies at about 3000 ft; the second in the centre around Tingo Maria (3000), where colonisation has been active during the past twenty to thirty years; and, the third, in the south in the Urubamba valley, which lies to the east of Cuzco. The cultivated areas in this border zone—totaling perhaps $\frac{1}{2}$ million acres in all—are mainly in large estates owned by white, or sometimes mestizo, landlords. The estate workers are usually Indians who have migrated from the highlands. Both commercial and



[Courtesy: Bolivian Embassy.]

FIG. 81.—These *siringueros* or rubber-curers work in the Beni River region. The coagulated latex is being smoked or cured over a wood fire.

subsistence crops are grown: chief among the former are cacao, coffee, tobacco, sugar-cane, and coca, products sufficiently valuable to bear the high costs of carriage to the Sierra and the coast. One of the problems of agriculture on the eastern flanks of the cordillera is that the profit on plantation crops so far distant from markets is eaten up by transport costs.

East of the border zone lie vast areas of flat jungle. Development of the forested lowlands of Loreto and Madre de Dios has been retarded by isolation, heat, humidity, thick selva, insect pests, fever, and hostile aboriginal peoples. Long neglected, Peru is now directing attention to her Amazonian territories and beginning to exploit them. Development, however, is bound to be slow and sporadic in view of the enormous difficulties to be faced, and there are no prospects of a sudden transformation of this Peruvian hinterland. Of the region's potentialities there is no doubt: immense reserves of timber and various other forest products, vast areas capable of being turned into plantations, possibilities of raising cattle, and petroleum deposits. But to realise this potential capital, communications, people, and scientific intelligence are needed. Without them little progress can be, or will be, made.

THE LE TOURNEAU PROJECT

An undertaking of far-reaching significance and a pointer to the future is the Le Tourneau Colonisation Concession. As a result of an agreement with the Peruvian Government, made in 1954, the Le Tourneau organisation, a United States company, is clearing 1 million acres of jungle in Pampa del Sacramento for colonisation. In return for the concession the organisation has contracted to build 38 miles of highway in eastern Peru. "This project, which is still in the experimental stage may prove to be of great importance to Peru. First, it is an experiment in forest clearance by machinery (including special machines for pushing over large trees). Secondly, it will make available for agricultural purposes almost as much land as is now used in all the irrigated valleys of the Peruvian coastal region (approximately 500,000 hectares). If the project is a success much experience will be gained and may be applied in other parts of the selva."*

Considerable progress has already been made there. At Tournavista, the village settlement of the concession territory which lies on the Pachitea River, some 600 steers, cross-breeds between Criollo and Brahma cattle, are being reared on an 800-hectare pastureland. The first token shipments of fine-quality frozen meat have already been flown from the Tournavista airfield to Lima. It seems likely that cattle production will be the first economic mainstay of the concession. Another development is rubber planting. Recently 2000 rubber trees were planted on an 8-acre plot. This is an experimental project, for the trees will take eight to ten

* COLE, J. P. "Recent Economic Developments in Peru." *Geography*, vol. XL 1955, pp. 196-200.

years to mature and yield rubber. Rice and maize have also been tried with varying degrees of success, as well as bananas, oranges, and other tropical crops.

It is probably still too early to make any assessment of the success or otherwise of the scheme. Many people are pessimistic about the ultimate outcome and aver that the jungle is doomed to a subsistence type of economy; they believe that the land is of such a quality and the locality so remote that large-scale development can, at best, be successful in only a very limited way. On the other hand, a recent observer at Tournavista has concluded that the project can, and will, be successful. "Historically," writes this observer,* "colonization projects in Amazonia have not met with a notable amount of success. A variety of factors such as insufficient development capital, the geographic isolation characteristic of such projects, the lack of certain newly-developed technical equipment, ineffective use of, or the non-availability of cheap air transportation and communications and a lack of 'know-how' were usually responsible for the failure of these projects in the past. A certain period of time, generally at least five years, during which such projects absorb capital like a sponge and offer little or no return must be expected and provided for. Finally, when such return in the form of agricultural products and livestock is generated and becomes available for sale, an economically profitable means must be established to bring these end-products to marketing areas." It will be interesting to watch the Le Tourneau project's progress. Success would undoubtedly lead to a more vigorous attack in the Montaña; failure would merely confirm the opinion of the pessimists and postpone indefinitely the opening up of these jungle backlands.

From the human point of view there are two important problems involved in the colonisation of the eastern lowlands. Firstly, the Peruvians, and especially the highland Indians, are not attracted to the area, while foreign immigrants cannot readily be induced to settle the Montaña. Secondly, the colonists who have come usually work as labourers on plantations, live on farinaceous foods with little fresh meat, fish, or green vegetables, and quickly succumb to the heat and humidity and to depression and disease. It would appear that a properly balanced diet, improved hygiene, and diversion and entertainment are necessary to keep the colonists healthy and happy. It is claimed that with such conditions colonisation can be successfully accomplished.

The indigenous inhabitants of the Peruvian selva, the Chunchos, are uncivilised or at best only partly civilised; some are hostile and some still carry on such gruesome practices as head-shrinking. The Chunchos live in palm-thatched huts, usually raised on piles, to keep them dry and free, or relatively free, of insects. The riverside communities are small, seldom consisting of more than three or four houses or a dozen or so people. The natives cultivate small patches under the *milpa* system, fish in the rivers,

* D. Leinbach, "Some Impressions of a Recent Visit to Tournavista," *Peruvian Times*, 15th May 1959.

and hunt the small fry of the forests; in addition, they collect the wild fruits and nuts of the forest and have come to know various medicinal herbs. As a result of their varied and fresh diet and their knowledge of the curative properties of many plants, the natives, in contrast to the immigrant Indians, are generally well nourished, healthy, and robust. Some of them engage in the gathering of rubber, the collecting of Brazil nuts, and the killing of alligators for their skins, while a few find work in the lumber camps.



FIG. 82.—Peruvian Oasis. A small oasis, visited as a health resort, in the Peruvian Desert. Set in completely arid country with wind-blown sand ridges, this small oasis contrasts with the more usual type of Peruvian oasis, which is strung out along a watercourse descending from the Andes.

One scarcely expects to find towns in the Peruvian selva, but there are, in fact, three settlements worthy of note. Yurimaguas (13,000) is a river port on the lower Huallaga; its only links with the outside world are downstream via the Amazon and by air, for it is fortunate enough to have an airport. Pucallpa, on the upper Ucayali, is a frontier settlement still in the pioneer stage of development, although its growth has been rapid, from a population of 500 in 1937 to some 20,000 at the present time. It is principally a saw-milling centre. Pucallpa is the terminus of the new road from Cerro de Pasco—an eastward continuation of the Central Highway. Iquitos (55,000), 1200 miles from Lima and 2300 miles from the mouth of the Amazon, is the major focus of commerce in the lowlands. It lies at the upper limit of steamboat navigation. It is an important collecting centre for animal and forest products, including skins, hides, wild rubber, gums, tagua nuts, and timber, which are brought from a wide area. Iquitos, which has paved streets, water supplies, buses, hotels, cinemas, etc., also has a number of industries, chiefly saw-milling, the pre-

paration of rubber, cotton-ginning, and oil-refining. Iquitos is steadily growing, and as the Peruvian selva is opened up the river port is likely to benefit much and expand accordingly.

PROSPECTS AND PROBLEMS

Although Peru has made great strides during the past fifty years, many problems still face the republic, some of which arise from the country's great geographical diversity. The steady improvement in communications is gradually breaking down the isolation which has hindered economic development and national cohesion: even so, there are many areas that are likely to remain isolated or at best only poorly served by communications for many years to come.

Agriculture poses another major problem, especially since such a large proportion of the population is dependent upon the land, and the arable and pastoral lands are inadequate to meet present wants. There is need of a substantial increase in the area under cultivation, of improved seeds and farming techniques, of improved pastures and improved stock, and of agricultural education. While recognising the limited possibilities of the Sierra, it is probable that under scientific management a considerable increase in productivity could be effected. The greatest hope for the future, however, probably lies in the utilisation of the Montaña.

Since agricultural possibilities over much of the country are restricted and since the population is now growing with considerable speed, it would seem that an increasing measure of industrialisation offers perhaps the best and quickest method of increasing the standard of living and absorbing the expanding numbers. Fortunately Peru possesses a variety of industrial raw materials—minerals, fibres, timber, forest products—on which processing and manufacturing industries can be based. Moreover, industrialisation has already made a beginning. Power in the form of coal, oil, and water is available in quantities sufficient perhaps to meet all Peru's requirements. There is, however, a lack of capital and technical skill, both of which are needed in quantity if the country's riches and resources are to be realised.

But the biggest problem facing Peru is a human problem. Fully half the population consists of pure-blooded Indians living predominantly in more or less self-sufficient settled communities outside the general political, economic, and cultural life of the country; in a word, they remain unassimilated. The Indians are characteristically melancholy and taciturn, often depraved and spiritless, unwilling to leave their bleak ancestral homeland, and apparently unwilling to change their ways of life. But unless they are urged to improve their lot and are helped to rise above their slothful degradation, the Indians will prove to be a handicap to Peru's development. No country can afford to have half its population a liability, living at or below subsistence level and in want and penury. How this challenge can be or will be resolved it is impossible to say; at all events it is likely to be a slow business.

In the past lack of capital, technical skill, communications, and government encouragement have stultified economic development. Now with foreign aid, scientific and technical help, and growing official encouragement, Peru's prospects are much happier. The country has much hidden and latent wealth: vast and varied mineral resources still lie untapped in the Andes; irrigated land could still be increased, perhaps by as much as 50%; the mountain streams are rich in potential hydro-electric power; the seas abound in fish; while nearly $\frac{1}{2}$ million square miles of jungle could produce enormous quantities of timber and a wide variety of plantation products. Summing up, Peru has every reason to be optimistic and can look forward to a prosperous future providing: (1) it is assured a long period of internal peace; (2) it can integrate its three sharply contrasted regions; (3) it can attract a measure of foreign capital investment; and (4) it can solve its Indian dilemma.

BOLIVIA

An interesting story, oft repeated, is told of British-Bolivian relationships during the latter part of the nineteenth century. In the year 1868 the British Ambassador to Bolivia fell into bad grace with the Bolivian dictator, Melgarejo, who had the minister stripped, strapped to the back of a donkey, and, in such an undignified state, expelled from the capital. When this outrage was made known to Queen Victoria she ordered a British warship to be despatched to Bolivia to demonstrate her displeasure. Upon learning that Bolivia had no coast and her ship no means of exacting satisfaction, the infuriated queen seized a pen and struck Bolivia off the map of South America. With a similar grandiloquent gesture, Melgarejo erased England from the map. For several decades after this incident Bolivia ceased to exist in the eyes of the British Government. This tale is apochryphal for at that time Bolivia had a coastline, but it is symbolic of the average Englishman's ignorance of Bolivia. Knowledge of Bolivia is virtually confined to two facts: that it is "the Switzerland of South America" and that it produces tin; and even this is only a half-truth nowadays.

Bolivia, whose independence dates from 1825 and whose name derives from the South American liberator Simon Bolívar, is, excepting Paraguay, the only South American country without a seaboard. Bolivia had a coastline until 1882, when, as a result of the War of the Pacific (1879-83), it lost its coastal provinces to Chile. As it exists today, Bolivia is a land-locked state surrounded on the west by Chile and Peru, on the north and east by Brazil, and on the south by Paraguay and Argentina. Originally 1 million square miles in extent, Bolivia has been whittled down to less than half its former size as a result of a series of unfortunate and disastrous wars with its neighbours. But in spite of this drastic pruning, Bolivia remains still a big country; with an estimated area of about 420,000 square miles, it ranks sixth among the states of Latin America.

PHYSICAL SURVEY

We have had occasion several times already to stress the violently contrasting environments occurring in Latin America, and Bolivia, like the other North Andean republics, is a land of emphatic physical, climatic, and biotic contrasts. Alcides d'Orbigny, a French explorer, aptly described Bolivia as "the microcosm of the planet," because within its boundaries are to be found practically every conceivable kind of scenery and type of climate known.

Physiographically, Bolivia falls into three parts: the high plateau enclosed by sierras on the west; the high valleys and gorges of the eastern flank of the Andes; and the lowland plains and hills to the east.

The western third or so of Bolivia (approximately 65,000 square miles in extent) consists of a great plateau, called the *altiplano*, lying at an average elevation of 12,500 ft between the enclosing ranges of the Andean cordillera, which reaches its maximum width in Bolivia. The *altiplano* is a bleak and sterile tableland, yet the economic life of the country has been traditionally concentrated there. So important has the *altiplano* been, that, until recently, the Bolivians tended to forget they possessed territories to the east.

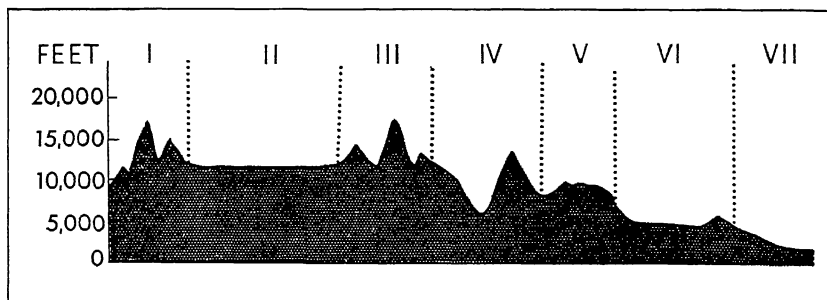


FIG. 83.—Bolivia: cross-section west to east. (I) the Western Cordillera, (II) the Altiplano, (III) the Eastern Cordillera, (IV) the Yungas, (V) the Cordillera de Cochabamba, (VI) the Santa Cruz Plains, and (VII) the Chaco Lowlands. The cross-section is approximately $18\frac{1}{2}^{\circ}$ south.

To the east of the Cordillera Oriental lies a belt of deep valleys and gorges separated by high ridges. The deeply trenched valleys have been cut by the swiftly flowing headwaters of the Madeira and Pilcomayo Rivers. The high ridges are formed by the eastward-projecting spurs of the Andes. The valleys are known as *yungas*, but the whole belt of rugged terrain is frequently and conveniently designated the *Yungas* region.

The eastern two-thirds of Bolivia is a vast lowland, the northern portion forming part of the Amazon drainage basin, the southern part of the La Plata basin. These two plains are separated by a tongue of hill country protruding from the Brazilian Highlands. This vast, remote, and undeveloped lowland formed until recently the "lost land" of Bolivia.

In Bolivia, as elsewhere in the tropical zone, climatic conditions are geared to elevation. Altitude, not distance from the equator, is the chief determinant of the climate. In the eastern tropical lowlands conditions generally are hot and humid, and tropical forest and jungle form the characteristic vegetation; in the *yungas* tropical through sub-tropical to temperate conditions occur, with corresponding variations in plant life, some areas having dense forest, some open woodland, some xerophytic scrub, and some grass; and in western Bolivia low temperatures, strong winds, and light rainfall prevail, resulting in (i) a bleak, cold climate on the plateau, which is treeless but supports bushes and sparse grass, and (ii) utterly frigid conditions on the high sierras.

Rapid changes in altitude within very short distances result in the close juxtaposition of extremely dissimilar climates. Within a distance of not much more than a hundred miles or an hour's journey by air one can plunge from cold, dry, snow-covered mountain slopes into hot, steaming jungle. "From the cool, sun-swept capital, La Paz, straggling up the ragged slopes of a deep ravine twelve thousand feet above the sea," writes Osborne, "you may drive in a couple of hours to Chacaltaya which boasts the highest ski-run in the world at 16,500 feet, or you may board a plane and in less than an hour immerse yourself in the lazy heat of Amazonian forest at Rurrenabaca on the river Beni."*

Isolation and inaccessibility are two features of Bolivia's geographical position that greatly handicap its economic development and hinder national unity. Cut off from the ocean to the west, Bolivia is dependent upon the good graces of her western neighbours, Peru and Chile, for outlets in that direction. In eastern Bolivia there are navigable rivers leading into the Amazon and the Río de la Plata, but they are far distant from the ocean and serve the least-developed part of the country.

POPULATION

Bolivia has only a small population for its size: current estimates give well over 3½ millions. With a density of eight to the square mile, Bolivia is the most thinly peopled of all the South American states. The population, moreover, is very unevenly distributed. The majority of the population is concentrated in the northern half of the *altiplano*; here, indeed, is the only substantial concentration of people. The eastern two-thirds of the republic are very thinly settled.

The population tends to occur in clusters of settlements in and around the mining areas, in small irrigated valleys and basins, and in the chief cities. There are few towns—not more than a dozen all told—and many of these are very small, with only a few thousand inhabitants. La Paz, with about 350,000 people, is the sole city of any size; none other reaches 100,000. The characteristic settlement of Bolivia is the small agricultural village.

Of the population a high proportion—over half—is Indian, pure-

* OSBORNE, H. *Bolivia*. London. 1954. P. 3.

blooded aboriginal stock. About a third are mestizos or *cholos*, peoples of mixed Indian and Spanish ancestry. A minority are of mixed European, though predominantly Spanish, stock. An official estimate of the racial composition of the Bolivian people is 54% Indian, 34% mestizo, and 12% white.

The native Indians form three main groups: the Aymaras, who inhabit the northern plateau, the Quechuas, living in the eastern and south-eastern valleys, and the Guaranis, much fewer in numbers, of the lowlands. The Indians form a poor, backward, illiterate element and play no part in the running of the country. The Europeans, together with the more intelligent of the mestizos, control the government, administration, and business of Bolivia. Osborne has summed up the characteristics and roles of the different human groups in the country thus: "The Altiplano Indians are descendants of those Aymara-speaking and Quechua-speaking peoples who formed the backbone of the old empire of the Incas. They are a hardy, dour, toiling, patient race, farmers and miners by preference and tradition, conservative in their outlook and distrustful of change. Highlanders by instinct, they are fanatically attached to the unprofitable soil of the Altiplano and will hardly be driven from it by famine or expropriation or lured by the incentive of easier conditions elsewhere. The cholos, who have grown up as a middle class between the Indians and the ruling white minority, are more vivacious, more ambitious and more enterprising, but also more fickle and more unstable than the Indian. Lacking the inherent sense of social responsibility which is found in a European peasantry, they are good material still to be fashioned. With them the future of the country rests."

SOCIAL GEOGRAPHY

National unity has never been strongly developed in Bolivia and is still very tenuous. Basically, there are two reasons, one physical, the other human, which go far to explaining this state of affairs.

Not only are there physical barriers dividing one part of the country from another, but settlement is patchy and discontinuous. People congregate in small valleys and basins where conditions are most attractive: hence the settlement pattern is characteristically one of dispersed clusters. Small, weak, isolated units do not make for closely knit sentiments and national unity.

The various clusters of people, moreover, show differences in their racial composition; some are almost exclusively Indian, especially on the *altiplano*, some predominantly mestizo and white, as in the Cochabamba Basin. The peoples of European descent and the native Indians form two incompatible racial and cultural groups. The mestizos, with their café au lait complexions, usually tend to consider themselves as being white, although some profess pride in their Indian blood. Commonly, however, those mestizos who achieve prosperity and social standing seek to intermarry with the white element. Although among the people "the ethnic

distinction is already becoming blurred," writes Osborne, "the differentiation into indigene, cholo, and white functions as a rigid social stratification."*

The Indians as a group are a primitive, poverty-stricken, and depressed class; for several centuries they have suffered exploitation and serfdom. They are the agricultural labourers and the miners. Although the 1952 revolution gave the Indians equality of status with the whites and *cholos*, it is likely that they will continue to be the manual workers of the country. As a racial type the Indians show a rare capacity for endurance; cold, hunger, and fatigue are accepted with philosophical patience. This insensibility to privation and an almost complete lack of ambition is not easy to explain: some have interpreted the Indian character in terms of the harsh environmental conditions, some blame Spanish colonial rule with its social depravement, yet others point to the habit of chewing coca; the truth may well lie with all.

It would be a mistake to lump all the Indians together as being of common mould; there are, in fact, wide differences between the Indians of the highlands and those of the lowlands. The Indians of the *altiplano*, mainly Aymara-speaking Indians, are of a taciturn and suspicious frame of mind, obstinate and conservative in their ways. By contrast, the Quechua-speaking Indians are more flexible and adaptable. Quechua life is ruled by three axioms: do not steal, do not lie, and do not be lazy. The native Indian tribes of the lowlands are few in numbers; many have been absorbed into a mestizo class, the rest are primitive and often semi-nomadic peoples who live outside the law of the land. But the native Indians, irrespective of the part of Bolivia in which they live, tend to retain their own ways of life and to cling steadfastly to their old traditions.

Illiteracy in Bolivia is high. The Indians and the mestizos in the rural areas are almost completely illiterate. The Aymara and Quechua tongues are spoken by the indigenous Indians. The *cholos* are bilingual, speaking Spanish and an Indian language, while the majority of Europeans speak one of the native tongues. The official language of Bolivia is Spanish. The Roman Catholic Church is established, but there is freedom of belief.

THE BOLIVIAN REVOLUTION OF 1952

Revolution is almost the national sport in Latin America, and Bolivia has indulged in it more than most countries. But the Revolution of 1952 was something more than a mere change of government: it marked a major change in the course of Bolivian history, and for that reason warrants some brief notice.

For half a century a handful of Europeans—the fabulously wealthy owners of the tin mines—had ruled Bolivia. These "tin barons" formed a state within a state and were powerful enough to name presidents and ministers. But in 1952 Bolivia experienced one of the most severe political upheavals in its history and, after heavy fighting, the National Revolu-

* *Bolivia*. P. 93.

tionary Movement (M.N.R.) took over the Government. The new government was nationalist and reformist in temper.

The ideals of the revolution may be summarised thus:

(1) Universal suffrage. All women over 18 and men over 21 years of age to have a vote. Previously, literacy and other qualifications were required of voters.

(2) Nationalisation of the mines. All mines to be government-owned, except for certain ones, together with state control of the export and sale of minerals.

(3) Agricultural reform. Each Bolivian individual to become the owner of 10 acres of land. Four or five families to be allowed to join their holdings together to form co-operatives.

(4) Educational reform. Free, compulsory education for all Bolivians up to the age of 17 years to be introduced. (45% of the national budget is now invested in education.)

(5) Social reform. Indians, cholos, and Europeans to have equality of status, and a national health insurance system to be introduced, based upon a contribution of 7.5% of the individual's basic salary.

The aim of the revolution was to assert Bolivian economic nationalism and broaden the basis of the economy, to nationalise the mining industry and make full use of the country's mineral resources, to integrate the degraded and depressed Indians into the life of the country, and to raise the standards of living, health, and education in the republic as a whole. In 1952 the administration embarked upon this programme with a courage and determination that the economic situation of the country scarcely warranted.

Just at this juncture an abrupt fall in the price of tin, tin being Bolivia's chief source of foreign exchange, resulted in an economic crisis (1953). Drastic measures were introduced in an attempt to solve the problem: these included the curtailment of imports, the fixing of retail prices, the freeing of wages, the subsidising of tin exports, and the devaluation of the currency. These measures achieved only a limited success, and but for timely financial aid from the United States economic ruin would have faced Bolivia. Although disaster was thus averted, the economic situation is still precarious.

Since the economic crisis of 1953 the Government has made a resolute attempt to reverse the traditional economic policy, that of dependence upon mineral wealth, into one of greater economic diversification and increased national self-sufficiency.

RESOURCES AND ECONOMY

The common designation applied to Bolivia throughout South America is *un pobre país*—a poor country. This is at once true and untrue; the gist of the situation is summed up in the phrase "beggars on golden stools." While the people in general are poverty-stricken and the country

backward and undeveloped, Bolivia's potential resources are great and varied. The republic is, unquestionably, well endowed, but it is "a land rich in unexploited and largely unexplored natural resources."

Land utilisation in Bolivia is estimated as follows: 0.5% arable and orchard, 44% forest and woodland, and 55.5% waste land. Considerably less than 1 million acres are under cultivation, and even this is carried on mainly by primitive methods. The smallness of the cultivated area and the backward agricultural methods employed cause food supply to be a pressing problem, and Bolivia is compelled to import considerable supplies of foodstuffs. And yet the low-lying country of eastern Bolivia is capable of producing large quantities of numerous crops. Land reclamation and management, labour supply and communications are needed to



FIG. 84.—Bolivia: general features.

open up these plains. Development of the *Oriente*, as the eastern lowlands are often called, is essential if Bolivia is to prosper, if the standard of living is to be raised, and if increased numbers of people are to be supported. The extensive forest resources of the *Oriente* are practically untouched, while much greater use could be made of the pasture lands of this tropical lowland.

For centuries mining has formed the linch-pin of the Bolivian economy. During the Colonial era the country was a major source of the mineral wealth that was greedily exploited by Spain. From early Inca times until the close of the nineteenth century, gold and silver were the most important minerals, and their winning dominated Bolivian mining activities. But during the last half-century tin has superseded them in importance, and Bolivia has been a major world producer, accounting for about a fifth of the world total production. She also possesses important deposits of antimony and tungsten ores, lead, zinc, and copper.

The production and export of metals, an activity which employed only some 50,000–60,000 Indian workers or a mere 4% of the gainfully employed population, has accounted for 95% of Bolivia's export trade by value, and tin has commonly constituted some three-quarters of this. In short, the products of the mines, and especially the profits from tin, have provided the overwhelming bulk of the national revenue and virtually kept the country going. The recent collapse of the tin industry has led to an economic crisis of a very serious nature. This is the penalty which all too often has to be paid when the economic structure of a country is dependent upon a single commodity.

Very fortunately for Bolivia petroleum has been discovered in the eastern plains near the Argentinian frontier, and although the resources have not yet been fully surveyed, there are indications that the reserves of oil are considerable. By 1954 Bolivia was producing sufficient for her own needs, and there is already a modest export trade. Total output in 1961 was just over 3 million barrels. Bolivia's main hope—at least her short-term hope—of future prosperity lies in oil.

TIN

The important role that tin has played in the Bolivian economy and the sudden collapse of this major economic prop demands a little elaboration and explanation.

Bolivia's chief asset since the sixteenth century, as we have just emphasised, has been its mineral wealth, and the mining industry has been the chief support of the country, earning practically the whole of the republic's foreign exchange. Silver from the Potosí region was the most important metal mined for some three centuries, but in the last quarter of the nineteenth century the relative value of metals underwent a change, and since about 1890 attention came to be diverted to tin, of which Bolivia possesses rich deposits. The large-scale mining of tin commenced in the 'nineties, and the first exports took place in 1895. Output

gradually increased until 1929, which marked the peak of Bolivian production, some 45,000 tons. In the early 'thirties several difficulties—the world economic depression, the threatened exhaustion of the richer veins, and the war with Paraguay, which denuded the mines of labour—beset the tin-mining industry. The introduction of tin quotas, fixed by international agreement, helped to maintain prices and bolstered the industry. For several decades tin accounted for about three-quarters of Bolivia's exports, earning the bulk of her foreign currency, while the export taxes on tin brought in half of all public revenue.

The tin-ore bodies occur in the Eastern Cordillera of Bolivia. The most important mining centres lie in the mountains between La Paz and Uyuni, especially east of Oruro, where the mines around Uncia and Llallagua have yielded prolifically. Most of the mines are situated high up in the mountains and, as only the native Indians can stand the harsh climatic conditions and rarefied air, the labour is performed by Indians. In the past they have toiled for a pittance and died in their thousands. About three-quarters of the Bolivian tin production was in the hands of three families, the Patiños, the Hochschilds, and Aramayos; the rest was controlled by small companies. The "tin barons" were all fabulously wealthy, especially the Patiños, and in matters political, economic, and social were able to call the tune. In the past the "tin barons" were so powerful and influential they could bring about the fall of any government that was hostile to them.

In 1950 the price of tin began to fall, and production in that year decreased to 31,000 tons. In the following year the decline in price continued, and tin output fell in sympathy. Bolivia was on the brink of a crisis. In 1952 there was a revolt, and the National Revolutionary Movement took over the Government. One of the first tasks of the new regime was the nationalisation of the mines. The mines of the big companies were confiscated and formed into the state-controlled Mining Corporation of Bolivia.

Unfortunately nationalisation came too late; even so, it is very doubtful whether it could have saved the tin industry. The Bolivian tin industry cannot compete successfully in the world market. Although some 40,000 tons of tin were exported in 1954, much of it was marketed at a loss, and in 1957 Bolivia suffered a net loss of 10 cents on every pound of tin produced. Obviously the production of tin, except under especially favourable conditions, is not economic. Already 4000 small- and medium-sized tin mines have closed down. In 1960 tin output had declined to less than 20,000 tons. The palmy days of tin production have certainly gone for good; many even go so far as to say the industry is finished.

Why has the industry collapsed? Why are the prospects for its recovery so bleak? A number of factors help to explain the situation. Fundamentally, however, the answer is supplied by production costs, which are the highest in the world. Labour costs are high in view of the poor-quality, inefficient labour; transport costs are high because of the difficulties of transport and the inadequate communications; supply and main-

tenance costs are high, since everything required by the mines and the miners—equipment, timber, food supplies, etc.—has to be imported or brought up from the *yungas*; and extraction costs are high because the best and most easily worked lodes are exhausted.

For some time it has been apparent that the tin deposits were approaching exhaustion, and most experts agree that the richer ore bodies are practically worked out. Undoubtedly tin still exists in quantity, but the lodes only yield between 1.25 and 2.25% of tin, which makes their exploitation far from being a lucrative business.

COMMUNICATIONS

As is the case in all the Andean republics, communications are far from adequate, but the irregularities of the relief are against communications, and highways and railways are both difficult and expensive to build.

Bolivia is approachable by railway from the west, the south, and the east. Direct railway connection to the Pacific is provided by the lines running to the Chilean ports of Antofagasta and Arica; there is also a rail-lake-rail link with Mollendo in Peru. Southwards there is a link-up with Argentina: one line runs southwards across the *altiplano* to join the Argentine system at La Quiaca; the other is the newly completed Santa Cruz-Yacuiba line (312 miles). Eastwards there is a line running from Santa Cruz to Corumbá (405 miles), where it links up with the Brazilian system, thereby giving access to the Brazilian port of Santos. Originally, there was a plan to link Cochabamba to Santa Cruz, but work on the line, which reached Vila Vila (32 miles), was suspended many years ago; the intended rail link has been replaced by a motor highway. A new 155-mile-long road has recently been completed linking La Paz and the River Beni. The road is intended to promote the development of the tropical province of Beni. Former attempts to join Beni with La Paz failed, owing to the technical difficulties of laying track over the rugged Andean ranges. The new highway crosses the mountains at an altitude of 15,000 ft.

Altogether there are, it is estimated, some 14,000 miles of first-, second-, and third-class roads. Good roads are few and far between. Communications between central and eastern Bolivia have been greatly improved by the building of the Cochabamba-Santa Cruz Highway, which was opened in 1954.* This modern highway, with its twin lanes, has a total length of 311 miles, although the distance as the crow flies is only 186 miles. The road is compelled to zigzag to negotiate the steep slopes. This road has provided a commercial link between the highlands and the south-eastern lowlands. Formerly, the movement of goods and people between these two regions was difficult, time-consuming, and costly, and the choice lay between aircraft and pack animals. The new road has provided Bolivia with a link which it had hitherto lacked and which was a necessary prerequisite for economic development.

* COLE, J. P. "The Cochabamba-Santa Cruz Highway, Bolivia." *Geography*, vol. XLIII, 1958, pp. 273-5.

Air lines serve the chief urban centres, and there are air links with neighbouring countries. Relatively little use is made of the many waterways which thread the eastern lowlands; most of the great and navigable rivers flow away from the highland core and do not lead anywhere.

There is still a great need for east-west links; not only are they required for increased economic development but they are also necessary for the political and social integration of the country.

BOLIVIA: REGIONS (Fig. 85)

THE ALTIPLANO

Bolivia is sharply divided into three regions: the highlands, the mountain valleys, and the eastern plains. The Bolivian highlands, in the west, consist of the Western and Eastern Cordillera and the high plateau between them—the *altiplano*, literally the high plains. It is a bleak, sterile, mountain-rimmed plateau covering an area of some 38,000 square miles and lying at a height averaging 12,500 ft. This plateau, although covering a mere 16% of the national area and by no means the most fertile part of the country, is, nevertheless, the real core of the republic, for here live most of the people and here are the principal towns. The *altiplano* dominates the political, economic, and social life of Bolivia.

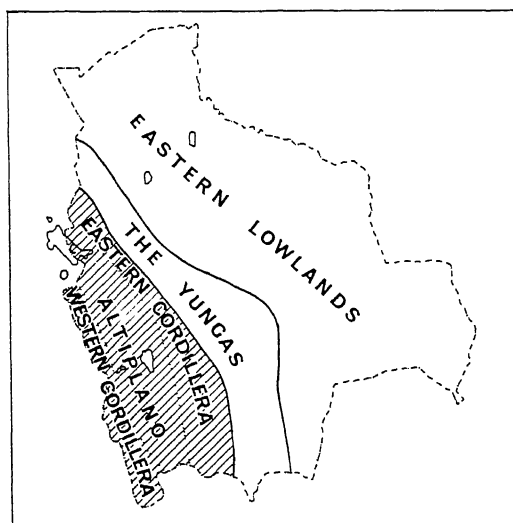


FIG. 85.—Bolivia: regions.

The great majority of Bolivia's population is concentrated in the northern part of the plateau lying immediately south of Lake Titicaca. Indeed, settlement has always been relatively dense in this area since pre-Inca times. This is explicable in terms of the better conditions existing here than elsewhere on the *altiplano*. Around the lake shores the density of population

reaches as much as 125 persons per square mile, but elsewhere it is generally much lower. Outside the towns, settlement typically is one of small groups of huts. The natural conditions, even in this most favoured area, are far from attractive. Temperatures are cool by day, in spite of much sunshine, and frost is common at night. Diurnal ranges are high. Moreover, it is relatively dry. The growing season for crops is short too, so that tillage is considerably handicapped by the climatic conditions. Even though irrigation is often used to supplement the meagre rainfall, it is reckoned that the Indian peasant farmer harvests only one good crop in three seasons.

Formerly, a semi-feudal land system prevailed in Bolivia and on the *altiplano*, and especially in the north, were many haciendas, so that a large proportion of the cultivable land lay in the hands of a few large landowners. The Agrarian Reform, initiated by the decree of 1952, has led to the breaking up of the large estates and the allotment of land to the

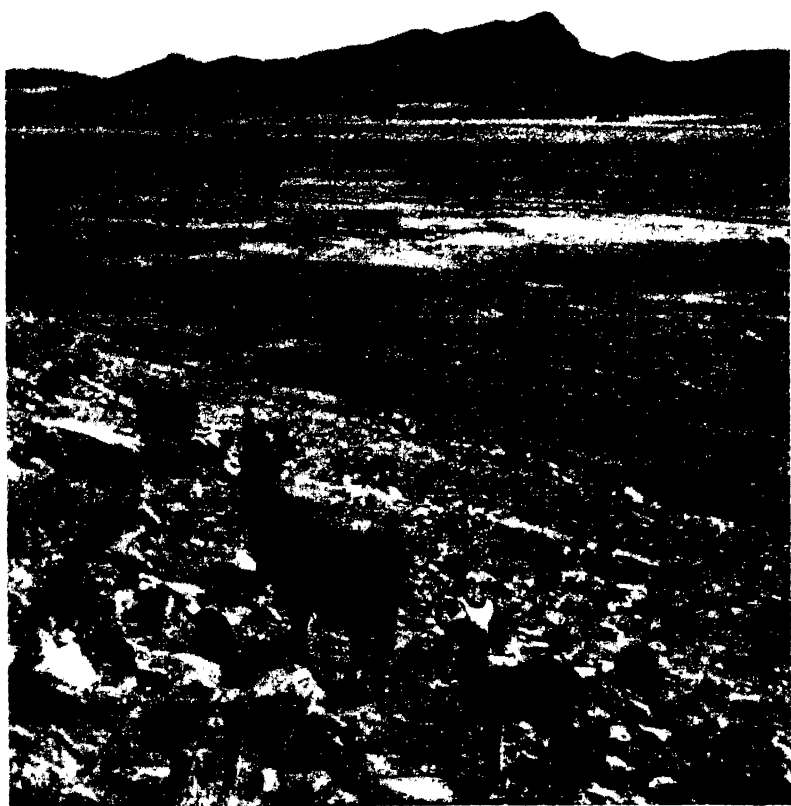


FIG. 86.—Note the flat, treeless expanse of the plateau. In the middle of the picture is a small peasant property. In the foreground are two llamas and a kid.

landless peasantry. The Indians today possess their own tracts of land, but agriculture is still gravely handicapped by rather low temperatures, low rainfall, poor soils, and antiquated methods of tillage. Collective production has many advantages over individual production, hence the Government is encouraging co-operative farming. This is acceptable to many of the Indians, since the ancient community tradition is still strong in Bolivia.

The principal crops raised on the *altiplano* are potatoes, barley, wheat, and quinoa. Potatoes, of which eight different varieties are grown, are the chief crop and one of the staple foods. Legumes and other vegetables are grown, but more especially in the Lake Titicaca basin. The principal cereal crop is barley, though this seldom ripens properly. Wheat can be cultivated only in the more favoured spots. Quinoa, which is a small hardy grain, is a useful crop and is grown to make flour for bread. During recent years the Government has paid particular attention to irrigation, with a view to increasing considerably the cultivable area.

Because of the light rainfall and dry, stony soils vegetation is sparse. There are no, or very few, trees on the windswept *altiplano*. The vegetation consists of sparse grasses with scattered tola bushes. In the drier southern portion of the plateau the vegetation becomes even more degraded and is characterised by patches of coarse bunch-grass and drought-

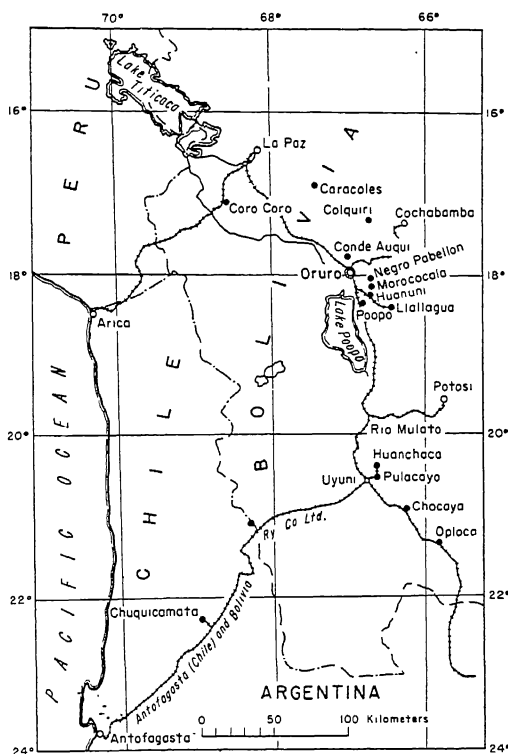


[Courtesy: Bolivian Embassy.]

FIG. 87.—Lake Titicaca is the highest fresh-water lake in the world. The reed boats are *balsas*. The boatman is gathering water-plants: these are used for feeding cattle.

resistant shrubs. The plateau depressions are areas of interior drainage, and although the hollows may hold shallow sheets of water during the rainy season, they turn into barren salt flats or *salars* during the dry period. The scanty herbage of the *altiplano*, however, is capable of supporting a pastoral industry, and large flocks of llamas, alpacas, and vicunas, animals capable of withstanding the rigorous conditions of the high plateau, together with sheep, are reared. Along with subsistence farming, pastoralism forms the basis of Indian livelihood.

Lake Titicaca, with an area of 3500 square miles, lies at an altitude of 12,500 ft. This great body of water, 130 miles in length, 35 miles broad, and 700 ft at its greatest depth, helps to moderate temperatures in the Lake basin. Not only is the Lake fished but water-plants are also collected and



[Reproduced by kind permission of John Wiley & Sons from C. M. Riley's "Our Mineral Resources."]

FIG. 88.—Bolivia: mining areas.

used as a feed for animals. Until comparatively recently all the traffic and fishing on Lake Titicaca was carried on by balsas, canoes built of bundles of totora reeds. Lake Titicaca is drained by the Desaguadero, a river which carries the overflow to Lake Poopó, 185 miles to the south-east. Poopó, unlike Titicaca, is a shallow, salty lake. Occasionally Poopó

overflows, when the water pours into the Salar de Coipasa. Farther south still is the vast Salar de Uyuni, a dreary, arid, salty wasteland.

Bounding the plateau are the Cordilleras. The Western Cordillera is a dry, cold, thinly peopled zone of little importance. The Eastern Cordillera, in contrast, is the most productive part of the Bolivian Highlands, for here are rich mineral deposits which commonly constitute over 75% of the Bolivian export trade. In addition to tin, which we have already noted, there are deposits of lead, zinc, copper, antimony, wolfram, and silver. Lead, zinc, and silver are mined in the Potosí district, while copper comes chiefly from the small mining centre of Corocoro.

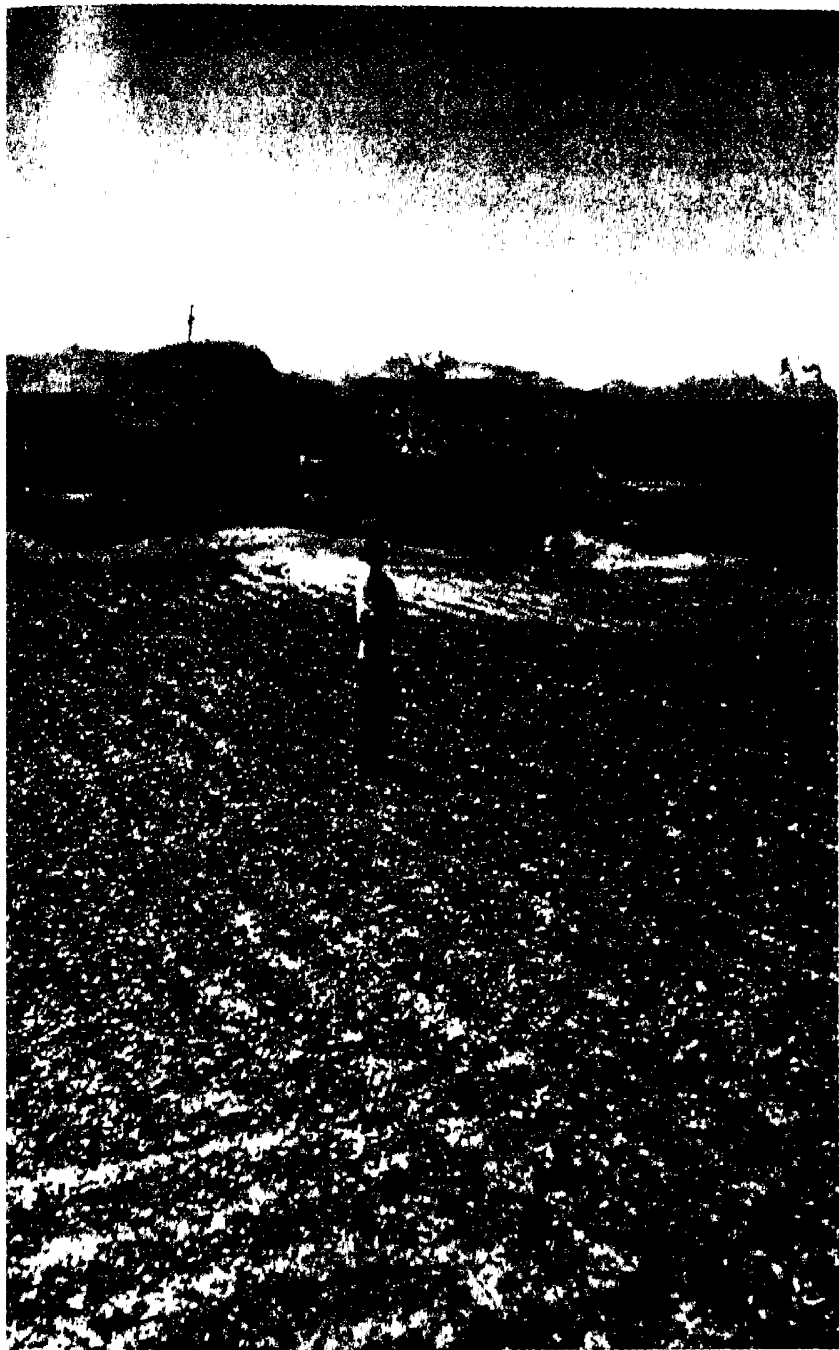
The most important towns of the Highlands are La Paz, Potosí, and Oruro. Not only are they the largest urban centres but they are also the only significant industrial centres. La Paz (353,000), the political capital of Bolivia, actually lies below the *altiplano*. It lies in a valley 1500 ft below the plateau. Its situation at 12,130 ft above sea-level makes it the highest capital city in the world. La Paz is a small, compact city, largely because of the limitations of its site; it is, indeed, a town of steep hills. Three quite distinct sections are discernible: the Indian quarters are found in the higher parts of the town: lower down is the administrative and business section; and lower still the residential area. Little of the original colonial settlement remains, and La Paz is essentially modern in its architectural style. In addition to being the political centre of the republic, La Paz is the leading commercial and manufacturing centre.

About 140 miles south of La Paz along the natural passageway which lies at the foot of the Eastern Cordillera and runs all the way to Villazon on the frontier with Argentina, stands Oruro (81,000), a mining and railway centre. A hundred or so miles south-east of Oruro is Potosí (53,000), famed for its silver mines. Standing at a height of over 13,000 ft at the base of the Cerro Rico, a mountain containing rich stores of tin and tungsten as well as silver, Potosí's fortunes have fluctuated. When the Spaniards discovered the silver of Cerro Rico, Potosí developed as an important centre and reached a population of 150,000. Later its importance dwindled as the value of the silver dwindled, and it became almost a ghost town. But with the growth of the demand for tin about fifty years ago Potosí received a new lease of life.

Apart from these three principal cities and a number of much smaller towns strung along the piedmont passageway, settlements consist of tiny clusters of adobe huts in which the Indians live in poverty and squalor.

THE YUNGAS

The second region is known as the *Yungas*. Strictly speaking, the term *yungas* refers to the deep valleys cut into the eastern slopes of the Eastern Cordillera, but the word is frequently used in a collective sense to embrace not only the valleys but the intervening ridges as well. The region comprises a mere 14% of the national territory, but contains fully one-third



[Courtesy: Bolivian Embassy.]

FIG. 89.—A small property on the Altiplano. Note the level plateau surface, the stony soil, and thatched dwellings surmounted with crosses.

of the total population. Agriculturally it is the richest and most productive area in the whole country.

The *Yungas* region forms a roughly north-south belt of extremely rugged terrain. Streams have bitten deeply into the mountain slopes carving out narrow, steeply sloping valleys which descend from about 10,000 to 2000 ft. The valleys are separated by mountain ridges which are eastward-projecting spurs of the Andes. The valleys are tropical to sub-tropical in their climatic character. The mean annual temperature is between about 60° and 65° F (15°-17° C). Rainfall varies: it is rather wetter in the north, where the valleys are exposed and the rainfall is between 30 and 35 in., somewhat drier in the south, where the valleys are sheltered and precipitation is between 25 and 30 in. The climatic difference is reflected in the natural vegetation: in the northern valleys there is thick tropical forest; in the southern there is open woodland with xerophytic shrubs and grassy areas. High humidity is characteristic of the northern *yungas*, but in spite of this the valleys are not unhealthy.

The valley floors are densely peopled, and a population map shows a ribbon-like pattern of settlement. Here and there are wider areas forming basins, three of which, the Cochabamba, Sucre, and Tarija basins, are especially noteworthy. Each of these contains important urban centres with the same names. The flat alluvial strips which margin the rivers and the more spacious basins are very fertile and generally well cultivated. The density of rural settlement is indicative of the productiveness of these *yungas*.

The Cochabamba basin is the richest, most productive and most densely populated area in the whole of Bolivia. It has a rural population density of over 300 to the square mile, while in addition to the town of Cochabamba (90,000), which is the second largest city in Bolivia, there are several other small towns in the basin. This fertile basin is the leading grain- and fruit-growing area in the country. It is also an important stock-raising area. Cochabamba itself, which lies at an altitude of about 8400 ft, is the principal distributing point for eastern Bolivia and is the focus of the internal air services. It is only an hour's flight to La Paz, with which it is also connected by railway. Much of the varied produce of the Cochabamba basin goes to the capital. Eastwards from Cochabamba runs the new metalled highway to Santa Cruz in the Eastern Lowlands. Cochabamba is also connected by oil pipeline to the oilfield in the extreme south-east of Bolivia and possesses an oil refinery. The town has developed several manufacturing industries, notably footwear, furniture, food processing, and fruit canning. There appears to be every prospect for Cochabamba's rapid growth.

About a hundred miles south of Cochabamba is Sucre, lying at an altitude of 10,300 ft. Sucre (60,000), the legal capital of Bolivia, was founded in 1538 and received its present name in honour of Jose Antonio de Sucre, the Marshal of Ayacucho, the first President of the Bolivian Republic. For long Sucre was an isolated city, and on this account possesses an air of

the past and a charm of character. It has many impressive buildings. In addition to it being the seat of the Supreme Court, Sucre is the home of the Archbishop and has a University founded as long ago as 1624. Recently Sucre has been linked by both railway and main road to Potosí; it also possesses an airfield.

Tarija (25,000) lies in the extreme south of Bolivia. This old settlement at an elevation of 6400 ft is the centre of another rich basin. It serves as the chief commercial centre of southern Bolivia, though it is rather handicapped by inadequate communications. There is plenty of scope for agricultural expansion in the basin. It is renowned for its orchards and vineyards and produces excellent crops of grapes, peaches, apples, and pears. But most of the fruit and other commodities are consumed locally because of the difficulties of export.

In addition to the half a dozen or so basins which are spacious enough to hold towns, there are many narrow valleys whose floors are patterned with ribbon-like farms. In the northern *yungas*, where conditions are more tropical, crops include sugar-cane, coffee, cacao, cotton, tobacco, maize, barley, and sunflowers. In the drier and cooler southern *yungas* wheat, barley, alfalfa, vegetables, and sub-tropical and deciduous fruits are characteristic. The leaves of the coca plant, from which the drug cocaine is prepared, are collected and transported to the *altiplano*. The Indians mix the leaves with lime, which releases the cocaine, and chew the mixture. The cocaine assuages hunger and helps the Indian to endure the privations and hardships of life on the *altiplano* and in the high mountains.

The inhabitants of the *yungas* are mostly peoples of European ancestry or mestizos. Theirs is a commercial type of farming in contrast to the subsistence agriculture of the plateau Indians. But, as we have already noted, there is, as a result of the inaccessibility of the *yungas*, the acute problem of disposing of cash crops. Only such as can withstand high transportation costs and which are not easily perishable can be exported. Hence one of the prime needs of this region so full of potential wealth is increased communications and transport facilities.

THE EASTERN LOWLANDS

The Eastern Lowlands, or *Oriente*, of Bolivia comprise about 70% of the total area of the republic. Yet this vast region has only a very thin sprinkling of people, and the four departments into which it is divided—Pando, Bení, Santa Cruz, and Tarija—mustered only about $\frac{1}{2}$ million people in 1950 according to the Bolivian census. However, during the past decade (1950–60) large numbers of Indians—some estimates put the figure at close on $\frac{1}{2}$ million—have migrated, largely from the *altiplano*, into these eastern plains. This *Marcha al Oriente*, or movement to the east, is the outcome of two factors: government policy and economic pressure. As we have already mentioned, this part of the national domain was for long the “forgotten land” of Bolivia and, partly for political and strategic

reasons, it has become prudent to occupy and develop this vacuum. The collapse of the tin industry and the closing down of many of the tin mines left the Indians with no livelihood, so many have sought a new life in the lowlands. Moreover, the *altiplano* is over-populated in relation to its agricultural possibilities and there is a surplus of agricultural workers; thus the Government has encouraged migration to the eastern lowlands. The State is providing land and farming implements, organising settlements, and projects, and ensuring that these pioneers are properly fed and kept healthy.

What kind of environment is the *Oriente*? Topographically it is an extensive plain stretching from the foothills of the Eastern Cordillera to the Brazilian frontier in the north and east and to the Paraguayan and Argentinian boundaries in the east and south. The plain slopes gradually from about 2000 to 500 ft along the frontiers. The entire area has tropical temperatures, but precipitation varies considerably from place to place. Because of the varying physical conditions the *Oriente* can be divided into three sub-regions.

(1) In the north the plains are merely a segment of the Amazon Lowlands. The terrain is low-lying and flat, drained by the Rivers Madre de Dios, Bení, and Mamoré, sluggish, meandering streams which in the flood season spill over the land and inundate wide areas. Dense tropical forest covers most of the 200,000 square miles. Temperatures in the north are around 80° F, and there are heavy rains. Though there are a few scattered, chiefly riverside, settlements, the population is small—under one per square mile. Large tracts are virtually uninhabited. Overland communications, with one exception, are by river or forest trail. The exception is the short stretch of railway which runs from Santo Antonio (in Brazil) to Guajará-Mirim; originally the line was planned to go to Riberalta, but with the collapse of the rubber boom just before the First World War work was stopped on the line and it was never completed. Riberalta, half a century ago, was an important collecting centre for wild rubber and, although a little high-quality rubber is still collected, Riberalta is now of small consequence, though it may yet see a new lease of life if this north-eastern corner is opened up and developed.

The economy of this northern sub-region is based on the collection of forest products (rubber, coca, medicinal plants, skins), on cattle herding on the savanna plains of Mojos in Bení, and on panning for gold. Tribal Indians live in isolated village communities often in riverside localities, but sometimes in the depths of the forest. Theirs is almost exclusively a self-sufficient existence; in addition to hunting and fishing, they practise shifting agriculture. Many of the Indians, especially those living outside the tribal communities, live a miserable existence, and many of them are geophagists or earth-eaters. During the rubber boom many of them worked under conditions which were tantamount to slavery, and if they did not die from the hard work and brutality meted out to them they died

from disease. Though there are a few trading centres, mainly collecting points for the products of the forest, there are very few settlements which may be classed as towns. The most important is Trinidad (10,000), capital of Bení, which is a cattle centre. Meat is flown from Trinidad to consuming centres in the *yungas* and on the *altiplano*. The town is still completely isolated and relies almost entirely upon air transport for links with the outside world.

(2) The second sub-region is formed by the low hill country which links the Andes with the Brazilian Plateau. This rolling hill country, the Chiquitos Highlands 1000–2000 ft in elevation, forms the divide between the Amazon and La Plata drainage systems. The forested plains of the north give way in this central section to open savanna country with scrub. Temperatures are generally fairly high, in the mid-70s, although appreciable drops in temperature occur when the *surazos*, cold, dust-laden southerly winds, blow. Rainfall is much reduced and more distinctly seasonal in character, a condition which is reflected in the vegetation.

The chief economic activity is grazing. The cattle ranches are large and often form self-sufficient units, growing the food crops needed to feed the estate workers. Until recently it was not easy to import foodstuffs. The ranches supply beef to the cities of the highlands and prepare dried beef for local consumption. There is also an export of hides. The Santa Cruz plains, like the plains of Mojos in Bení, form excellent grazing grounds, and efforts are now being made to develop further the cattle industry, which in the past was based upon semi-wild animals. Zebu and Santa Gertrudis breeding stock have been imported to raise the quality of the cattle.

The recent completion of the Cochabamba–Santa Cruz Highway and its continuation the Santa Cruz–Corumba Railway will do much to ease and speed up the settlement in this area. Until Santa Cruz became linked to Cochabamba by road the town was almost completely isolated and Cochabamba was reached by undertaking a three week's journey by mule. Santa Cruz itself is a very old settlement founded by the Spaniards in 1595. But because of its isolation it remained small, and in 1954 its population was only about 25,000. In 1963 it had jumped to 55,000. Its future growth seems assured, however, since its isolation has been broken and it lies in an area of great potential productiveness. Already immigrants are colonising the area, and sugar-cane, rice, maize, oranges, vanilla, cotton, and kenaf fibre are being grown. Besides Indians from the highlands, Mennonites from Paraguay and numbers of Japanese have settled in the district. What hidden resources the area has is unknown, but recently a major deposit of iron ore was discovered at Motun and now iron ore, as well as timber and sugar, is being exported to Argentina through the river port of Puerto Suarez.

(3) The third sub-region may be designated the Bolivian Chaco. This is an area of flat plains country which is very sparsely peopled. Sub-tropical in temperature, the region has heavy rains—30–50 in.—between November and April which give rise to widespread flooding, and drought

during the remainder of the year, when the watercourses dry up and the land becomes parched. The vegetation is savanna, tall, coarse grasses interspersed with scattered stunted trees, with patches of forest and communities of palms in some of the moister localities. Altogether this is far from being an attractive environment, and would be of small value to Bolivia but for its petroleum deposits.

Oil was first discovered at Bermejo in 1924. Another field was located at Sanandita in 1926, yet another at Camiri in 1927. Newer fields were found at Guairuy (1947) and at Toro (1955). The only really important field is the one at Camiri. More recently, however, oil has been struck at Sipuati but the significance of this new find remains to be proved. Total production runs at $3\frac{1}{2}$ million barrels annually, enough to supply Bolivia's modest internal needs and to leave a margin for export to Brazil, Paraguay, Argentina, and Chile. Pipelines run from Camiri to Cochabamba and Sucre, where there are refineries. Another pipeline runs southwards to Yacuiba on the Argentine frontier, whence go most of the exports. All the oilfields and refineries are in the hands of the state-owned *Yacimientos Petroliferos Fiscales Bolivianos* (Y.P.F.B.), but eleven foreign concerns have been granted concessions, which all told cover an area of some 12 million hectares.

Chapter IX

THE BRAZILIAN CONFEDERATION

THE BRAZILIAN BACKGROUND

PORTUGUESE AMERICA, as distinguished from Spanish America, falls entirely within the United States of Brazil. With an area of 3,289,000 square miles, Brazil is easily the largest Latin American country; indeed, it ranks as the fourth largest state in the world, being exceeded in size by only the Soviet Union, China, and Canada. Brazil is larger than continental United States, without Alaska, by a quarter of a million square miles. It covers virtually half—47% to be exact—of the South American continent and forms a compact country. With a population of 85 million, Brazil possesses approximately half of the continent's total inhabitants.

Politically, Brazil is a confederation of twenty-one states with a number of outlying territories and a federal district, that of Brasília, the new capital. In the north Brazil is bordered by the three colonial territories of the Guianas and by Venezuela and Colombia; on the west by Peru and Bolivia; and on the south by Paraguay, Argentina, and Uruguay. Hence Brazil has common frontiers with all the South American countries excepting the republics of Chile and Ecuador. Not merely is Brazil the largest Latin American country: it is now the strongest and most influential, having overtaken its rival Argentina, and is likely to become the leader of the Latin American world in the future.

Sub-continental in size, Brazil is a land of paradox: it is at once a country of riches and poverty, of fertility and scarcity, of long-settled areas and unexplored virgin territory, of modern twentieth-century civilisation and primitive native culture. Great regional contrasts exist: here is impenetrable selva, there is desolate plateau, here thorn scrub, there grassy plain. Brazil lies predominantly within the tropics. Even so, the variety of climate is wide, and such climatic differences, together with differences of relief, give rise to about half a dozen different regions. It is these regional differences which are so important economically to the country, for they allow a wide range of crops and animals to be raised.

The map of Brazil, at least in its political aspect, fails to reflect the geographical conditions obtaining in the country. The majority of the people and their activities are confined to a belt, approximately 300 miles wide, fringing the eastern coast. The coastal regions of Brazil are, for the most part, well populated, urbanised, and well-cultivated, but the interior is sparsely inhabited and undeveloped; much of it, in truth, is still largely unknown. In the remote and inaccessible highlands and backlands is a vast region with much potential wealth waiting to be tapped. The old

rocks of the plateau contain rich deposits of gold, iron, nickel, and manganese, while the tropical grasslands provide extensive ranges capable of supporting millions of cattle. The enormous forested lowlands of the Amazon basin hold out possibilities for the production of tropical com-



FIG. 90.—Brazil: administrative divisions.

modities on a large scale. There is no doubting Brazil's tremendous economic potential, and with such immense possibilities the republic is a land of promise and opportunity.

Settlement and development have not been uniform in the past, and the result is that the density of population and the degree of development vary between very wide limits. Brazil's future prosperity and power will depend upon the extent to which she develops her interior. Though there is a "pioneer fringe" gradually moving westwards, it is a slow, nibbling movement. A more vigorous attack is needed. But Brazil is faced and handicapped by many problems and difficulties, foremost among which are vast distances, lack of transport, lack of capital, shortage of man-power, and poor social services.

PHYSICAL FEATURES AND GEOLOGY

Broadly speaking, Brazil is composed of three major physical units—a portion of the Guiana Highlands in the north, the great lowland of the Amazon, and the vast Brazilian plateau. In addition, Brazil also includes part of the lower slopes of the Andes and, in the south-west, a portion of the upper Paraguay plains. Fronting the Atlantic, at the foot of the plateau escarpment, is a narrow coastal plain. In brief, the relief of Brazil may be described as consisting of plateaus, arranged in successive terraces, and surrounded by sedimentary plains. The plateau averages 1000–3000 ft high; a bare 3% of the country exceeds 3000 ft. The central and western parts of the Highlands consist of fairly flat plateau land, but in the east the country is traversed by successive mountain ranges separated by great valleys. Approximately five-eighths of Brazilian territory consists of medium-altitude highlands; the rest comprises plains. 40% of Brazil consists of lowlands less than 65 ft above sea-level. The most extensive low-lying areas occur in the Amazon basin; the states of Amazonas and Pará, which together cover over 1 million square miles or 32% of Brazil's total area, are mainly wide, low-lying, forest-clad plains. The other two plains areas are the Paraná-Paraguay lowlands and the coastal lowlands.

The geological structure of Brazil, in spite of its complexity, may be broadly defined as consisting of a foundation of crystalline rocks, partially covered by beds of sedimentary rocks with an overlay of horizontal capping strata. The rocks of the Archaean basal complex outcrop over about a third of the total area. The soils originating from the decomposition of these crystalline rocks are comparatively fertile. The Pre-Cambrian rocks of the Proterozoic era, which followed the Archaeozoic, while exposed only over a very small area, are especially important, since the richest mineral deposits are found in them; they supply Brazil with her principal sources of minerals, notably immense deposits of iron ores—among the largest and richest deposits in the world—manganese, nickel, lead, and silver ores, gold, diamonds, rutile, and bauxite.

Sedimentary strata cover more than half of the land surface, the most important of these capping rocks being the sandstone formations. Towards the end of the Triassic period extrusions of molten lava took place on a large scale, spreading out to form one of the greatest sheets of basalt in the world. The sheet covers an area of nearly 35,000 square miles and runs to a depth of 2000 ft in places. These flows are known as the "Paraná Traps." These outpourings are of geographical significance, since the decomposition of the basalts and diabases has produced the purple-red earths known as *terra roxa*, soils of great fertility which are particularly well suited to the coffee plant.

Coal deposits, inferior in quality, are found in the four southern states of Brazil. From Río Grande do Norte to the south of Bahía occur beds of sandstone, limestone, and shale, which are important, since they constitute the oil-bearing formations of the Atlantic coast. The oil

from these marine deposits is already being extracted in the Recôncavo field.

RIVERS AND DRAINAGE

No account of Brazil, however brief, would be complete without some mention of the hydrography for it is a country of great rivers. Brazil possesses one of the most extensive river systems in the world, and the great watersheds give rise to many major streams.

If one accepts the Ucayali as the upper course of the Amazon, then the latter has a length of 4500 miles. If the Maranhão be excepted, the length is reduced to 3700 miles. In area, the Amazon basin covers $1\frac{1}{2}$ million square miles. The Amazon is generally 1-2 miles wide, but in flood time the waters spread out to nearly 4 miles from bank to bank. For more than 2000 miles it flows in leisurely fashion over the great plain with an average drop of only just over 1 in. per mile. Its slow rate of flow—a mile and a half per hour—is considerably increased when the river is in spate.

The volume of water disgorged into the Atlantic is estimated at 3,500,000 ft³ per second, carrying with it more than 100 million ft³ of silt every 24 hours! The trunk of the Amazon collects a dozen or so major tributaries which flow down from the Guiana Highlands, the Andes, and the Brazilian Plateau. When the Amazon overflows its banks, which it does frequently, it fills the dry or marshy channels, cuts, or depressions which lie on its flood plain and inundates vast areas to form extensive lakes or swamps known as *campos de varzea*. Navigation of the Amazon and its tributaries is limited by the changing level of high water, but during flood time some 37,000 miles of waterway are reckoned to be navigable. At all seasons the Amazon is navigable by ocean-going steamers as far as Iquitos, some 2,300 miles upsteam, but during low water the tributaries only provide draught for small, flat-bottomed craft.

The rivers of the Brazilian Plateau exhibit a mature, simple pattern. The most important of the Plateau streams are the Paraná, São Francisco, and Tocantins. In the north-eastern sector of the Plateau, which is a semi-arid region, the rivers are torrential and extremely irregular in their flow, drying up during the season of drought. The São Francisco, 1800 miles in length, which, incidentally, offers the best and least obstructed route into the interior of Brazil, tends to be erratic, with considerable variation between high and low water. Along the Upper Paraguay an extensive area of low land is subject to flooding during the rainy season—a phenomenon which has earned the district the name of *Pantanal*, perhaps best interpreted as “floodlands”—although it quickly dries out again in the hot dry season.

Along the eastern coast, particularly south of Río de Janeiro, coastal lagoons have been formed by the silting up of creeks and the blocking of rivers at their mouths by dunes, shoals, and bars. Long, narrow spits or *restingas* form barriers enclosing great stretches of water, such as the Lagoons of Patos, Mirim, and Mangueira in the state of Río Grande do

Sul. Smaller lakes of similar origin occur in the State of Rio de Janeiro. Much of the eastern coastal plain is marshy, but one section at least has been reclaimed: this is the 125-mile long plain known as the Baixada Fluminense, situated between the sea and the mountains in the state of Rio de Janeiro. Formerly a swampy lowland, subject to recurrent flooding, the Baixada Fluminense has been reclaimed by constructing dykes or levees and installing pumps. Many other areas which are marshy or suffer periodic flooding await the attention of Brazilian hydraulic engineers.

CLIMATE AND VEGETATION

Little need be added to what has already been said in the introductory chapter. Brazil's climates and natural vegetation may be summarised, briefly and broadly, as follows:

(1) The whole of the Amazon Basin and the coastlands as far as Cape de São Roque have an equatorial regime. The persistently high temperatures give rise to much evaporation, and convection causes heavy precipitation almost every day. The constant heat and moisture favour equatorial rain-forest or *selva*, which covers most of the basin.

(2) The eastern coastlands, approximately from Cape de São Roque to Rio de Janeiro, receive heavy rainfall, since they lie athwart the in-blowing ocean winds, the South-east Trades, and are backed by steeply sloping lands. The amount of rainfall varies, and while the northern section has a summer maximum, the south receives most rain in winter. Temperatures throughout are high. Tropical forest is characteristic.

(3) In the north-eastern shoulder of Brazil the rainfall is less abundant and very unreliable. It lies in the rain-shadow of the Planalto da Borborema and other ranges. Temperatures are very high all the year round. As a result of the shortage and fickleness of the rainfall, the tropical forest degenerates into thorny scrub-forest known as *caatinga*.

(4) Most of the Brazilian Plateau has a tropical climate characterised by a hot, wet season and a warm, dry season. The temperature ranges from tropical in the valleys of the northern margins to sub-tropical in the centre and south, where altitude brings some modification. Local differences in the climate and in the vegetation occur as a result of differences in relief and variations in the amount of rainfall. Forest occurs in places, but over most of the plateau savanna grassland and open scrubby woodland prevails.

(5) The southern part of the plateau, roughly south of the tropic, falls within the warm temperate belt, and the climate may be designated humid-temperate. Winters are warm and wet, summers hot and wet. Temperatures, however, are lower than elsewhere in Brazil, and frosts may be experienced. The well-distributed reliable rainfall supports mixed sub-tropical forest, with araucaria pine and stretches of rich grassland.

(6) In the extreme south in the southern portion of Río Grande do Sul, which borders Uruguay, more truly temperate conditions occur. On the lowlands here temperatures are more moderate and there is a well-distributed rainfall. The cooler conditions suit temperate prairie grassland, which is the characteristic natural vegetation.

POPULATION AND SETTLEMENT

The present-day population is officially estimated at 75 millions and is increasing rapidly. During the decade 1940-50 the rate of population growth was 2.5% a year, a figure which puts Brazil among those countries of the world having the greatest population growth. There is every reason to believe that Brazil's rapid population increase will continue for a long time to come, for the people of Brazil are young—some two-thirds are between the ages of 5 and 39—they are prolific, and there is a sharply declining death-rate. Within the space of two generations the population numbers have doubled; by the end of the twentieth century the total is likely to exceed 100 millions.

The present population of Brazil is still small, however, in comparison with the area and its carrying capacity and is insufficient to occupy effectively more than a fraction of the country. Even after half a century of immigration on an extensive scale, which added some 5 million souls to Brazil's population, the republic still has vast unoccupied territories in the interior and large areas of undeveloped fertile land fit for European settlement, particularly in the grassland and mixed-forest region of the south. The Government has, however, restricted the number of immigrants, and the intake now is highly selective. It was realised that to allow an unrestricted entry of poor southern and eastern Europeans, who would be content to live on bare subsistence terms, would contribute little, if anything, to the country's economic development and prosperity and would, moreover, interfere with social progress. Hence, as in so many other countries, restricted immigration is the rule; only scientists, technicians, and other skilled workers are readily permitted to enter the country. Whether from the long-term point of view this is a wise policy or not, it is difficult to judge.

Brazil has been called the greatest melting pot of peoples in the world. Here are found representatives of practically every race. From the earliest days of European control three components in the population have existed. These are (a) the aboriginal Indians, (b) the European immigrants, and (c) the imported Negroes. These three elements still exist, but a gradual intermixing is taking place. Miscegenation has occurred since the Portuguese first arrived in America, for the early adventurers came without their womenfolk, and therefore took Indian wives or mistresses, which led to the beginnings of a mixed race.

A semi-official estimate in 1922 gave the composition of the population as 51% white, 22% mulatto, 14% Negro, 11% mestizo, and 2% Indian. The total population was estimated at about 28 millions. A census in 1940

gave the population as 41½ millions, an increase of nearly 35% over the previous census figure. According to the 1940 figures, the racial composition of the population was as follows: some 26 millions or 63% were white, 6 millions or 14% were black, and about 9 millions or 23% were *pardos*, i.e. mixed in race. The proportion of whites may seem large, but in fact a big proportion of those calling themselves "white" have a dash of coloured blood in their veins. Of the three racial stocks the Europeans and the Negroes are flourishing, although these two components are mixing rapidly in North-eastern Brazil through the process of intermarriage, while the Indian is being squeezed out, and in certain areas is slowly disappearing as a clearly distinguishable type. In no other part of the world is such an intermingling of racial types taking place, and it will be interesting to see what eventually results. Certainly, a new race is in the making. Fusion is by no means complete, but a new type is gradually emerging, which in the populous south at any rate is predominantly white, but which shows the tinge of the coloured strains.

Population growth has varied considerably from place to place. It has been greatest in the south, where between 1920 and 1940 it amounted to 59%; São Paulo state, for instance, rose from 4.6 to 7.2 millions during this period. While most of the people live in the coastal fringe and the greatest population increases have occurred here, the area accounts for only about one-third of the total; over the rest of the country, the north and the west, settlement is very sparse—often under two persons per square mile—and the population amounts to a mere 7% of the total. Moreover, these under-populated regions have not experienced any notable population increase. The congregation of most of the population in Eastern Brazil is not surprising, however, since this is the most favoured part of the country: here is a coastal location together with flat or rolling land suited to cropping or grazing, fertile soils, congenial climate, and forest, mineral, and power resources.

Approximately 60% of Brazil's population is rural, but, as in so many other countries, there is a decided drift of population from the countryside to the towns. Brazil's essentially agricultural basis has so far restricted urban growth to a few large centres located mainly on or near the coast, but these are growing rapidly, and Rio de Janeiro and São Paulo have witnessed a phenomenal rate of expansion. Urban attraction is growing apace throughout eastern Brazil. Man-power for the fields and plantations, already short, is becoming a problem which is aggravated by this drift to the towns.

BRAZIL'S ECONOMIC HISTORY

Brazil's present-day economy and her attitude to economics is more readily understood if her economic history is appreciated. A brief résumé of her economic past therefore seems desirable.

Brazil's economic history falls into three phases. Each phase, in the beginning, proved successful, but only the last of them, avers Camacho,

"gives signs of ensuring an ultimately prosperous and stable economy."* The three phases are: (1) the single commodity plantation economy, which characterised the colonial era and the Empire; (2) the diversified agricultural economy, which commenced with the establishment of the Republic; (3) the mixed agricultural and industrial economy of the present day, which has been developing since the end of the First World War.

The Portuguese, like the Spaniards, had been attracted to America by the lure of easily gotten riches. They sought gold and silver and gems. But Brazil proved disappointing; the precious metals and the precious stones were, apparently, absent. The "get-rich-quick" adventurers who had come seeking wealth had to stay in Brazil once there and to live they were compelled to turn to the land. Thus it came about that the Portuguese began to exploit the natural resources of the country. In order to help them till the land and grow crops the Portuguese enslaved the Indians, but they proved unsatisfactory, were dispensed with and replaced by imported Negro slaves. The early economic development of Brazil may be said to have been founded upon the labour of the enslaved black men.

In the very earliest days of Portuguese occupation the sole source of wealth was Brazil wood—*pau Brasil*—a red timber which produced a dye. For a while it provided the only worthwhile item of export. Its importance lies in the fact that it set the pattern for the monocultural economy which Brazil practised for close on four hundred years.

From the beginning of the sixteenth to the beginning of the present century Brazil's economic history has been dominated by a series of "single-commodity cultures." Three main products—sugar, gold, coffee—have, in their turn, been Brazil's staples and dominated a period of its history. Each period has witnessed the rise of a commodity which dominated the world market for a time and then declined in face of outside competition. Besides these major economic cycles there have been several minor cycles, such as that provided by cotton during the first half of last century and rubber at the end.

Each of these single-commodity staples led to the development of a specific region. Sugar-cane, which appears to have been introduced into Brazil from Madeira in 1532, was grown in the north-east around Recife and Bahía. Brazilian sugar dominated the world market right up to the end of the seventeenth century, when other tropical countries began to cultivate cane and were able to produce it more cheaply. Just as the sugar industry had passed its zenith, gold and diamonds were discovered and a new phase was ushered in. The gold economic cycle really began in 1693, but reached the peak of its prosperity during the third quarter of the eighteenth century. The State of Minas Gerais, which literally means "mines everywhere," became changed from an unpopulated wilderness into a well-populated and developed region. By the nineteenth century, however, the golden age was over and its place was taken to some extent first by cotton and then by rubber, which enjoyed a fantastic but short-lived

* *Brazil*. Royal Institute of International Affairs.

boom. Towards the close of the nineteenth century Brazil's third major staple, coffee, began to dominate the economy. To a certain extent Brazil is still in the coffee cycle, but though coffee remains the most important single item in the country's export trade, its overwhelming dominance has now passed. The coffee cycle led to the development of the State of São Paulo.

Overproduction of coffee during the early years of the present century and the economic difficulties attendant upon such caused many farmers to begin growing other crops, and when, after the First World War, the price of coffee dropped this diversification of the agricultural economy proved to have been a wise move. Since that time Brazil has ceased to put all her eggs in one basket and has continued to diversify her economy. This diversification has now been extended to include industry and manufacture as well as a wider variety of agricultural products. Since the Second World War, which gave a tremendous fillip to Brazilian industrialisation, the Republic may be said to have entered its third phase of economic development.

THE ECONOMIC BACKGROUND

According to the *Oxford Economic Atlas of the World*, land use in Brazil is as follows:

| | % |
|--|------|
| Arable and orchard | 2.2 |
| Permanent meadow and pasture | 15.6 |
| Forest and woodland | 46.5 |
| Waste and unproductive land | 35.7 |

Approximately 45 million acres are cultivated; the bulk of this acreage occurs in the four southern states of São Paulo, Paraná, Santa Catarina, and Río Grande do Sul, which are better developed than any of the others. But even in these states the percentage of land under cultivation is small: in São Paulo it is under 20% and in the other three under 10%. The vast regions of the Amazon Basin and the Interior Plateau possess only a very small fraction estimated at about 4% of the entire cultivated area. It is obvious why the cropland is concentrated in the eastern margins of the country. The land best suited for cropping and having the most fertile soils is found in Southern Brazil in those areas formerly covered by tropical forest, araucaria forest, and temperate grassland. Brazil's pastoral lands, besides covering a much larger area than the croplands, are also much less concentrated; even so, over half of the pasture land occurs in the States of Minas Gerais, Goiás, and Mato Grosso. The natural grasslands of the temperate south and the planted pastures of the eastern part of the plateau, occupying abandoned cropland, provide the best pastoral country. Although extensive natural pastures occur elsewhere, the quality of the forage is poor and the carrying capacity low.

For a long time now Brazil has been held to be one of the most promising

lands for agricultural development, and in connection with this belief Sir John Russell* has given two interesting quotations. The first is by the late Lord Bryce, who wrote, in 1912, "No country in the world possesses so large a proportion of land available for the support of human life and productive industry." The second is taken from the 14th edition of the *Encyclopaedia Britannica*, published some fifteen years later, in which the writer of the article on Brazil forecast that "with the immense areas in central and southern Brazil adapted to cattle raising Brazil seems destined eventually to outstrip Argentina, the United States, and Australia, as the greatest purveyor of the world's meat supplies." On these quotations Sir John makes his own comment: "More than twenty-five years have since elapsed, but these high hopes have not yet been fulfilled." This, unfortunately, is the truth about Brazil. Visitors, writers, even geographers, appear to have been mesmerised by Brazil and hoodwinked by its apparent potential riches and possibilities. The difficulties hindering and hampering development have either not been understood or have been glossed over. This, of course, is not to deny that Brazil possesses enormous potentialities: it does, but their realisation is likely to be slow. Perhaps now for the first time in its history the prospects for expansion and development are most propitious. Industrialisation is now proceeding apace, and this more than anything else is likely to lead to the opening up and development of the country. The late Sir Dudley Stamp,† who visited Brazil, made this comment on the state of the Republic: "Anyone who visits Brazil can scarcely fail to come away with the impression that here one of the great giants of the earth, which has been sleeping for some time past, is now awakening and developing with quite incredible vigour. It is a country of vast resources of land, vast resources of minerals, and a vast potential for people and production." Maybe, after all, in the not too distant future, we shall see the promise, long hoped for, actually materialise.

Of the country's man-power, about 25 million people are economically active; of these 50% are gainfully employed in agriculture, 18% in industry and mining, 5% in trade and commerce, and 3% in transport and communications; the remainder are engaged in professional work, service industries, etc. The increase of workers engaged in industrial activities from 10% in 1950 to 18% in 1960 is indicative of the tremendous advances which have been made in industry and manufacture since the end of the Second World War.

AGRICULTURE

Brazil is primarily an agricultural country, and the growing of crops and the raising of animals have been the characteristic occupations of the people from the beginning of colonial times. Agriculture continues, as in the past, to be the chief economic mainstay of the country. In spite of the recent growth in mining and manufacturing, the bulk of the people are

* *World Population and World Food Supplies*. London. 1954. P. 455.

† "South American Prospect." *Geographical Journal*, vol. CXXIII, 1957, p. 339.

dependent, either directly or indirectly, upon crop production or animal husbandry.

As already indicated, most of the agricultural activity is confined to the eastern margins of the country, and even here only a small proportion of the cultivable land is actually productive. However, except for a few commodities, chiefly wheat, Brazil is able to produce sufficient foodstuffs and raw materials for her own requirements and a surplus for export. In fact, 90% of Brazil's export income comes from agricultural production.

Brazil produces a wide range of tropical and sub-tropical crops and several temperate crops. The chief crops are maize, rice and wheat, manioc, coffee and sugar-cane, beans and cotton. Together these account for some 90% of the cultivated land. Crops of lesser importance include bananas, oranges, tobacco, cacao, potatoes, and yams.

Maize, besides being the leading cereal, is the principal crop, covering about a quarter of the land under cultivation. It is grown mainly around the lower Amazon and in the eastern states from Bahia southwards. Rice takes second place, the chief producing states being Minas Gerais, São Paulo, and Rio Grande do Sul. The cool temperate cereals are unimportant, and in the case of wheat only about 500,000 acres are devoted to it. Apart from rice—rice and beans form the national dish—cereals do not form the staple foodstuff; their place is taken by cassava and tapioca, which are prepared from manioc or mandioca. Manioc is widely grown throughout eastern Brazil and in the lower Amazon basin.

Coffee is the great cash crop of Brazil. About 10% of the total cultivated area is devoted to it, and the annual production is of the order of $\frac{3}{4}$ million tons. During the 1960-61 season output amounted to 33 million bags. Brazil is by far the world's largest producer of coffee, accounting for 48% of total world production. Although coffee is the chief export crop and the great money earner, less reliance is now being placed on it, and present government policy is to foster the production of other export crops in order to broaden the basis of Brazil's prosperity. For a more detailed account of coffee growing and production see pages 350-356.

Cotton has long been established in the north-eastern shoulder of Brazil and during much of the nineteenth century it formed the main product. When slavery was abolished in 1888, labour supply became something of a problem, with the result that cotton growing declined in importance. It began to receive serious attention again after the coffee slump in the 1930s. Cotton is grown in two main areas and in two main forms. In north-eastern Brazil, in the States of Ceará, Rio Grande do Norte, Paraíba, and Pernambuco the variety grown is tree cotton; output from this region accounts for about a quarter of the total production. The second area lies in the south, in the states of Minas Gerais, São Paulo, and Paraná, where the annual variety of upland cotton grows well. The state of São Paulo is overwhelmingly the most important producing area in the whole of Brazil accounting for well over half the total production, although the output has fallen during recent years due to soil exhaustion. Brazil is one

of the world's greatest cotton producing countries, for, with some 6 million acres devoted to it, it occupies fifth place.

Sugar-cane, the first of Brazil's plantation crops, continues to be grown, and the area under cultivation is expanding. Brazil now ranks third as a sugar producer, being exceeded only by Cuba and India. Cacao cultivation is almost confined to the warm, damp tropical coastlands of Bahia, which produce over 95% of the Brazilian production. The area under cultivation in eastern Brazil is gradually being extended, and Brazil already ranks second, after Ghana, as a world producer. The tobacco plant has been known in Brazil since the end of the sixteenth century, and is now cultivated in every state, but the major producers are, in order of importance, Bahia, Rio Grande do Sul, Minas Gerais, Santa Catarina, and Pernambuco. Brazil's tobacco crop was 324 million lb. in 1960—17% over the 1959 harvest. Whereas Bahia produces black cigar tobacco, Rio Grande do Sul specialises in lighter cigarette tobaccos. Castor-oil seed is one of Brazil's specialities, and the Republic is the largest castor-oil seed exporter in the world.

Brazil has exceptional advantages for fruit cultivation. Not only has

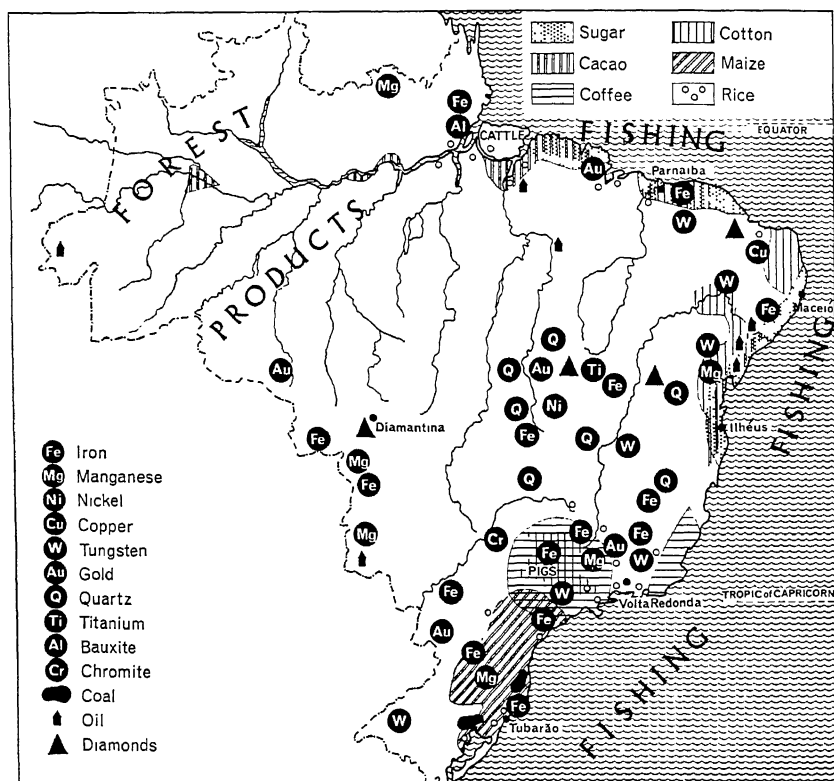


FIG. 91.—Brazil: economic features (livestock areas are shown in Fig. 92).

she a variety of native edible fruits but imported species do very well in many regions. Modern methods of fruit cultivation are being practised to an increasing extent, and special attention and care are being devoted to the picking, packing, and handling of fruit. All kinds of fruits are grown: tropical kinds in the north, Mediterranean varieties in the south, but bananas, oranges, and pineapples are the most important fruits produced. Brazil produces more than 234 million bunches of bananas a year—the largest output in the world—1½ million tons of oranges, and about 80 million pineapples. Vine cultivation is carried on in eastern Brazil south of Río de Janeiro, but production is mainly concentrated in Río Grande do Sul, where viticulture is expanding rapidly and owes much to the Italian element in the population, in whom the art and science of vine cultivation seems to be inborn. Brazil now produces some 20 million gallons of wine a year, sufficient for her own requirements.

Table XII shows the chief features of Brazilian crop production.

TABLE XII
Crop Production

| Crop | Acreage (in million acres) | | | | Production (in thousand tons) | | | |
|-----------|-------------------------------|---------|------|------|----------------------------------|---------|-------|-------|
| | 1924-25 | 1934-38 | 1950 | 1960 | 1924-25 | 1934-38 | 1950 | 1960 |
| Maize . | 6.2 | 10.5 | 10.8 | 18.3 | 4,182 | 6,600 | 5,800 | 8,890 |
| Rice . | 1.3 | 2.2 | 4.6 | 8.4 | 728 | 1,250 | 2,975 | 5,384 |
| Sugar . | | 0.4 | 1.9 | ? | 831 | 1,031 | 1,750 | 3,454 |
| Coffee . | 5.2 | 8.6 | 6.9 | 10.9 | 874 | 1,446 | 1,079 | 1,796 |
| Cocoa | | | | | | | | |
| beans . | | 0.45 | 0.64 | 1.3 | 58 | 124 | 128 | 180 |
| Bananas . | | 0.06 | 0.1 | ? | | 1,479 | 3,169 | 5,148 |
| Oranges . | | | | | | 1,172 | 1,252 | 1,947 |
| Cotton . | 1.6 | 2.1 | 5.2 | 7.0 | 262 | 389 | 600 | 483 |
| Tobacco . | 0.2 | 0.25 | 0.35 | 0.35 | 59 | 92 | 106 | 162 |

TABLE XIII
Animals (millions)

| | 1912 | 1920 | 1932 | 1949 | 1962 |
|--------------------|------|------|------|------|------|
| Cattle . . . | 31 | 34 | 43 | 46 | 76 |
| Sheep . . . | 11 | 8 | 11 | 18 | 74 |
| Goats . . . | 10 | 5 | 5 | 8 | 11 |
| Pigs . . . | 18 | 16 | 22 | 25 | 50 |
| Horses and mules . | 9 | 7 | 9 | 7 | 12 |

With the exception of coffee, most of the significant crops, and certainly all the food crops, have shown a considerable increase in acreage and total output since pre-war days. The increased production is not normally the result of better methods of cultivation, for, generally speaking, crop yields seem to have declined slightly. The exception to this generalisation is rice. Increased production is, then, the outcome of extended acreage.

These facts warrant some explanation and call for some brief comment upon farming methods and techniques.

The rapidly increasing population and the high prices to be had for many crops in the immediate post-war years stimulated expansion and led to the opening up of new areas. Brazilian agriculture, however, is characteristically wasteful and unscientific. Since there is land in abundance, there has been, in the past, no need to conserve the soil. When the soil was exhausted the land was abandoned and new territory broken. Dr. C. F. Jones,* an American authority on South American geography, has neatly summarised the salient features of much Brazilian agriculture thus: "Much of the farming is still characterized by extravagant employment of human labour, little use of machinery, forest destruction, soil wastage and erosion, and shifting cultivation. The system consists in (1) felling with an axe all but the largest trees, which are girdled; (2) burning near the end of the dry season; (3) planting with a hoe or stick a plot of corn, beans, rice, manioc, and even cotton; (4) perhaps chopping out weeds with a machete; (5) harvesting a few crops, usually not more than three or four; (6) planting grasses to be grazed until scrubby trees choke out the grass, or simply abandoning the land for a newly cleared plot." This is the system practised by millions of Brazilian peasant farmers in northern and interior Brazil and is to be found also in the east. The practice is not confined to the small-holder; it has been the rule on most of the large coffee estates. But it would be misleading to imply that such wasteful and primitive methods are to be found everywhere. In some parts of the country and among some peoples more scientific methods are practised. For instance, the market-gardening areas in the vicinity of the large towns, the dairying districts, the irrigated areas of the north-east, the vine-growing regions of the south, the rice lands of *Rio Grande do Sul*, and some of the sugar-cane and tobacco areas show some features characteristic of modern, scientific farming methods. Many foreign immigrants, notably the Germans, Italians, and Japanese, who are used to careful husbandry of the land, have done much to introduce new techniques and improve farming standards. Finally, it should be noted the Government is taking a very active interest in all matters related to agriculture and by means of experimental stations, agricultural research, crop subsidies, irrigation and drainage projects, product standardisation, etc., is helping to improve crops and farming methods.

Although in many areas farmers are adopting up-to-date methods of cultivation and scientific techniques, much Brazilian agriculture is still backward, being characterised by manual labour, hoe cultivation, absence of crop rotation, absence of manures and fertilisers, and a purely exploitive attitude to the use of the land.

The pastoral industry is a widespread branch of Brazilian agriculture. but the industry is neither as important as it should be nor as it could be. The reasons for this inadequate development are, fundamentally, the

* "Brazil." *Focus*, Vol 15, November 1964.

result of poor-quality stock, low-grade pastures, and unsatisfactory farm management. These are intimately related and react upon each other. The problem of pastures is closely bound up with that of improving live-stock in general. The adaptation of imported breeds is very largely dependent upon the quality of the feeding-stuff provided, which is the main basis for the building up of a superior-grade herd. Good natural pasture occurs in some areas, but the extensive savanna grasslands provide only

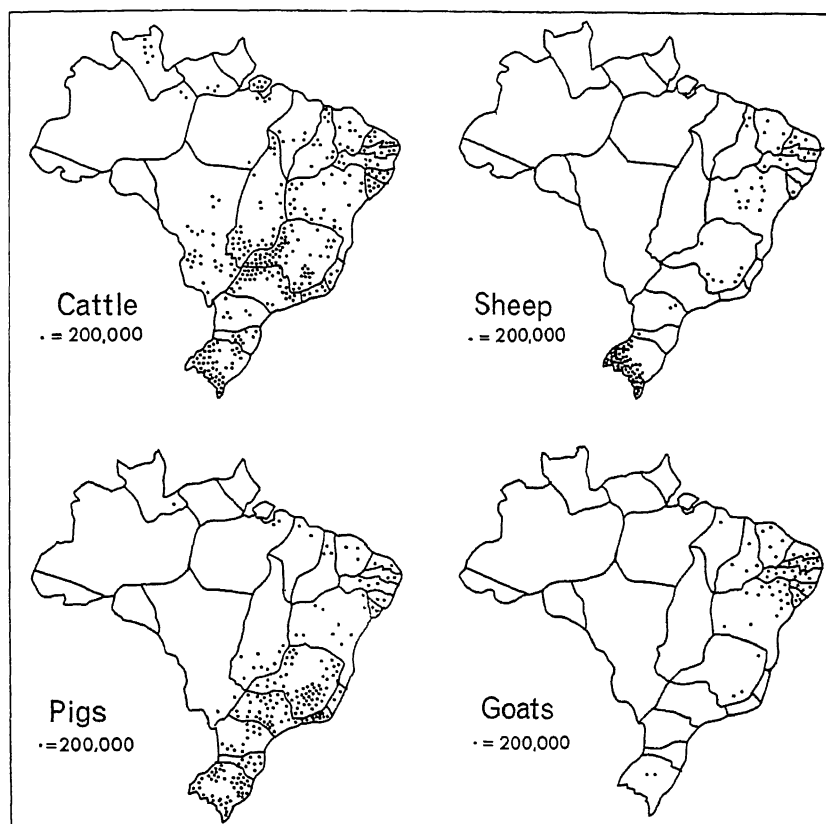


FIG. 92.—Brazil: distribution of animals.

mediocre feed. Cattle-men for the most part graze their herds upon unimproved pastures. Cultivated pastures occur in São Paulo and are used for fattening purposes. The best grasslands are found in the extreme south, in the region adjoining the Uruguayan pampas, and it is not surprising that the state of *Río Grande do Sul* leads in animal husbandry. More than a quarter of the cattle and two-thirds of the sheep are found in this southernmost state. São Paulo and Minas Gerais rank next in order of importance. Some cattle are raised on the *campos* of the central plateau, but they have to be moved to the seaboard states for fattening before they can be

slaughtered. The tropical grasslands of the interior offer wide ranges for extended ranching, but further development is linked up with the provision of transport facilities and packing plant. Sheep are reared chiefly in the far south, almost entirely in *Río Grande do Sul*, where conditions are cooler—temperature being the critical factor in their distribution. Goats are widely reared, but are concentrated chiefly in north-eastern Brazil. Pigs are numerous, and Brazil is the third largest pig-breeding country in the world, ranking after China and the United States. Swine are most numerous in *Río Grande do Sul*, *São Paulo*, and *Minas Gerais*.

Greater numbers of cattle and pigs occur in Brazil than in Argentina, although sheep are fewer. Beef production, however, is considerably smaller and beef exports much smaller; exports, moreover, are diminishing. The fundamental reason for the low export, as compared with Argentina, is that Brazil has a much greater home market to serve, although deficiencies in transport facilities and packing plant also contribute towards explaining the situation. Nevertheless, the pastoral industry does form the basis of a significant trade in meat, frozen and chilled, meat products, and hides and skins. The wool clip (52 million lb in 1960), which comes mostly from the sheep farms of *Río Grande do Sul*, is consumed almost entirely by Brazil's textile mills.

FORESTS AND FOREST PRODUCTS

Forests cover an estimated 1000 million acres, or half Brazil's total land area. Few countries possess such extensive forest lands and such a wealth of timber. Although the forests produce timber and a variety of valuable commercial products, they are comparatively undeveloped. In a world ever hungry for timber and finding more and more uses for timber, Brazil has a wonderful natural resource and source of wealth which she could capitalise. Many obstacles, to be sure, hinder the exploitation of the forests, but Brazil, increasingly, is turning to and tapping her forest resources.

The forests furnish a wide variety of timbers, ranging from the very hardest to the lightest kinds, and numerous secondary forest commodities, including wax, oils, rubber, nuts, fruits, maté, medicines, tannin, and fibres.

Brazil's forests may be divided into three main groups: the Amazonian rain-forest, which forms the largest continuous stretch of tropical forest in the world, the *Río Doce* woodlands, covering a large part of eastern Brazil, and the Southern forests, of a more temperate character, which spread over the Southern States. The forests of the Amazon Basin are little exploited, although some hard and fancy timbers are rafted down to *Belém* for export shipment. Some fifty years or so ago the bulk of the world's rubber, which was collected from the trees growing wild, came from the Amazon Basin; nowadays, only a token quantity comes from the region. The Brazil nut is native to the Amazon Basin, and the nuts are gathered by collectors. Numerous trees yield vegetable oils, but the extraction of oils is not highly developed. The States of *Bahía* and *Espirito Santo* possess wide areas of tropical forest which yield among other

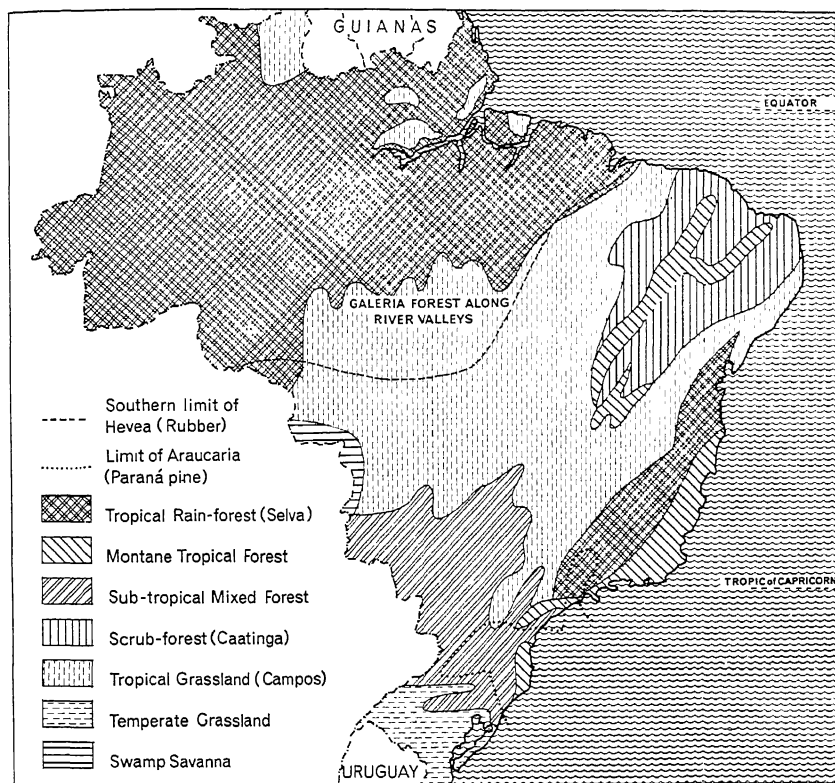


FIG. 93.—Brazil: forests.

things oiticica oil, carnauba wax, and coconuts. The forests of São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul are the most important at the present time. The araucaria pine forests, covering an extensive area, are commercially the most exploitable, hence the logging industry is best developed in the Southern States, where over 2000 saw-mills are located. The araucaria, or Paraná pine as it is commonly called, accounts for about 85% of the timber export.

Forest conservation is something which all Latin American countries have neglected until very recent times. The Brazilian Government, however, has come to realise the importance of conservation, and it is appreciated that reforestation must go hand in hand with lumbering if the country's reserves—large though they may be at present—are not to become rapidly exhausted in future generations. Thus, in the principal lumbering regions seedlings are planted as each section of forest is cleared.

FISHERIES

The Brazilian fishing industry is worthy of a brief consideration, not merely because it has the second largest catch of any of the South American

countries but also because of its possibilities. With a coastline which extends for more than 4300 miles and with thousands of miles of rivers and streams, it is not surprising that Brazil has important fisheries although the contribution they make to the economy is not as great as it might be. The output from the Brazilian fisheries has shown a substantial increase during recent years—between 1939 and 1949 it showed an increase of 40%*—and is indicative of the increasing attention being paid to the fishery resource. The Government has taken a keen interest in the industry; among other things it has advanced money to fishermen, provided capital for canning plant, developed fishermen's associations, regulated the conduct of fish markets, and carried out experimental and research work in animal biology. This interest has, without doubt, been one of the principal factors in the greatly increased output of recent years.

Since Brazil possesses thousands of miles of well-stocked rivers and streams, there is a considerable output of fresh-water fish. About 5% of the total recorded catch, which in 1961 was 330,000 tons, consists of fresh-water fish, although the actual catch may be significantly greater, since "a substantial proportion of this fresh-water catch is probably not fully recorded because of the scattered and near-subsistence nature of some of the interior river settlements."† Amazonia has considerable fishery resources and a large variety of fish. Only two species, however, are caught and commercially processed: these are the pirarucu, a large fish, which is salted and shipped to other parts of Brazil, and the peixe-boi (a name meaning "beef-fish"), which yields meat, oil, and hide. Turtles are also caught in the Amazon, and are valuable both as a delicious food and as a source of tortoiseshell.

In the "bulge" area, where a narrow continental shelf exists, tropical species occur in moderate numbers. The area off the mouth of the Amazon forms the richest fishing ground. The most common varieties caught are the albacora (sword-fish), bicuda (barracuda), garoupa (grouper), and voador. Sharks are found off the entire Brazilian coast, but one kind, the caçao, abounds off the coast of Maranhão and is extremely valuable for the raw materials it yields. A factory has been set up in São Luiz for processing the caçao. Shark meat is sold in all the fish markets. Shrimps, prawns, crabs, lobsters, and clams are caught in the waters off the shoulder of Brazil.

The South Atlantic coast is considered to be Brazil's best fishing ground, and the States of Rio de Janeiro, Santa Catarina, and Rio Grande do Sul account for over a third of the total Brazilian catch. In the cooler southern waters different species occur. Anchovy and sardines are abundant; other fish caught in this region include mullet, bagaré, and corvina.

Brazil has some 68,000 commercial fishermen, although many natives of the interior are part-time fishers. The output per fisherman is small, approximately a mere 5 tons per capita a year. Obviously, there is room

* MORGAN, R. *World Sea Fisheries*. Methuen, 1956. P. 259.

† *Ibid.*

for improvement in this respect. Average per capita consumption is low—about 7 lb a year—thus plenty of room exists for an expansion in demand.

MINERALS AND POWER RESOURCES

Brazil possesses mineral wealth of great variety, and, in the case of a number of minerals, in great quantity. The exploitation of this wealth has been slow; several reasons account for this: many of the deposits are of relatively recent discovery, many are located in relatively remote areas, many are inaccessible because of lack of transport, capital for mining has been absent, and until recent times the demand for them has been lacking. Mineral output is now of great and increasing importance to the Brazilian economy. Production has shown a considerable expansion since the Second World War. Most of the mining localities are situated in the eastern and southern regions: this is due, not only to factors of geology, but also to reasons of geography and demography. In surveying Brazil's mineral resources it should be borne in mind that such an account is essentially an interim assessment, for not much more than a third of Brazilian territory has been thoroughly explored in respect to its mineralogical possibilities.

Brazil is especially rich in iron ores, most important of which are the haematite (locally known as itabirite) deposits of Minas Gerais. These ores are of exceptional purity, the best having an iron content of 68% and more, and less than 0.002% of phosphorus. It is probable that these are the largest and richest iron-ore deposits in the world. So far they have been inadequately exploited because of the cost and poorness of fuel available and the distance from markets. Now, however, they are being worked near Itabira by modern, mechanised, open-pit methods. In 1962 Brazil produced some 10 million tons of iron ore.

Farther south, in Paraná and Santa Catarina, magnetite deposits of great value occur. Rich manganese ores are found in Minas Gerais and Bahía, and both are being worked. Brazil's manganese ores rival those of the Soviet Union and India; indeed, they may well form the world's largest deposit. Monazitic sands occur on the east coast, and most of the world's monazite comes from Brazil. Brazil, too, supplies the major part of the world's requirements of high-quality quartz crystal. Also mined, in larger or smaller quantities, are gold, silver, molybdenum, nickel, tungsten, and titanium ores, and diamonds. Although Brazil is richly endowed with many important minerals, she appears to have a shortage of others, especially copper, lead, zinc, and tin, and the chemical and fertiliser minerals.

With respect to fuel and power resources Brazil is less handsomely endowed. Coal of poor quality is found in Santa Catarina and Rio Grande do Sul. It occurs in thin seams, has a high ash content, and is of low heating power. Though used in some industries and also by the railways, it is of little value for smelting purposes, and coking coal has thus to be imported. Production is just over 2½ million tons annually. During recent years coal imports have totalled about 1½ million tons.

So far, Brazil is not an important producer of oil: petroleum has been found, but not in any great quantity. Drilling has taken place in four distinct regions: in the Cretaceous coastal belt in the states of Alagoas and Pará; in the Permo-Carboniferous formations of the south in São Paulo, Paraná, and Santa Catarina; on the fringe of the Amazonian geosyncline in Pará; and in the far west in the Territory of Acre, close to the Peruvian border. Production is being pushed ahead in Bahía, where the Recôncavo area has producing wells and recently oil has been found at Querera, near Tuoana, but probably the Amazon Basin offers the best long-term prospects.

The oil situation may be summarised thus: in 1956 Brazil had 118 producing wells yielding 11,000 barrels per day; this amounted to 100% increase on the previous year. Petroleum production in 1959 amounted to 25 million barrels, or 40% of domestic requirements. In 1963 Brazil possessed nine refineries. By 1963 Brazil had 717 producing wells yielding 40 million barrels annually. The search for, and output of, oil in Brazil has been slow, and the main reason for this is the Government's unwillingness to allow foreigners concessions to explore and exploit. Brazil is bent on keeping her oil for herself. To this end she founded *Petrobras*, a semi-state, semi-private company which is responsible for all oil prospecting, but unfortunately the company suffers from lack of capital and is making headway only slowly. It would pay Brazil to divest herself of this phobia about "imperialist exploitation" and to grant opportunities to foreign companies; the increased output would not only bring wealth to Brazil but would also save the currency she has to spend on importing Venezuelan oil, currency which she urgently needs for purchasing capital equipment from abroad. One power resource, however, she has in abundance: this is water-power. Brazil has, at a minimum estimate, 25 million h.p. Her potentially great hydro-electric power resources are being increasingly developed, although only a mere 3-4% of the potential has been harnessed. Wood is widely used as a fuel in Brazil, and many factory boilers and railway engines are fired with wood.

INDUSTRIAL DEVELOPMENT

Industrial expansion has been the most significant feature of the Brazilian economy during the past generation. Even before the Second World War Brazil had become the chief manufacturing country in Latin America, but both the difficulties and opportunities provided by that war did much to consolidate and foster her industries. Some indication of this tremendous industrial expansion is provided by the following facts: during the war years (1939-45) over 15,000 new factories were established, during the past twenty years industrial production has increased threefold, while during the same period the numbers of workers engaged in industrial manufacturing have roughly trebled. At the present time 15% of the gainfully employed population is engaged in manufacturing, while manufactured goods account for about one-fifth by value of Brazilian exports,

a proportion which is remarkable considering that formerly Brazil has always contributed essentially agricultural products to international trade.

A number of conditions or factors have favoured this rapid expansion of industry: (1) the large and growing domestic market and the gradually increasing standard of living; (2) the increasing urbanisation of the population and the availability of a labour force; (3) the impetus of the Second World War, which created shortages of many manufactured goods; (4) the determination of the Government to widen the basis of Brazil's economy and give the state a more balanced economic structure; (5) the assistance given to industry by the Government in the form of import controls and direct aid; (6) the large-scale investment of foreign, particularly United States, capital in Brazil; (7) the help provided by increased power production, especially cheap hydro-electric power; and (8) the availability of a wide range of industrial raw materials produced within the country.

In the early stages of Brazil's industrial development manufacturing was almost entirely confined to the production of consumer goods, but during recent years the heavier-type industries have begun to assume importance; indeed, the most noteworthy developments during the past decade have been in the capital-goods industries. The processing of foodstuffs and the manufacture of textiles are the two dominant branches of industry, and account for nearly 60% of the total value of industrial production.* Even so, the most remarkable developments have been in the iron and steel industry. Of the other industries, the chemical, cement, glass, rubber, and leather industries have all witnessed an expansion. And side by side with these industries "a whole range of light industries is springing up and these are often the mainstay of new pioneer settlements."†

The textile industry is the largest single industry, employing over 255,000 workers in some 2275 establishments. Cotton is easily the most important branch of textiles, and sufficient cloth is woven to meet the demands of the home market and to allow an important export of cotton piece goods. There are also many rayon, silk, and jute mills, and a few woollen factories.

The metallurgical industry ranks second and employs about 125,000. Metal-working is, in fact, a long-established industry in Brazil, but the large-scale production of iron and steel is a new development. The establishment of an important iron and steel industry in a country is usually considered to be a tower of strength in the industrial structure and may be said to concretise a country's economic freedom and independence. For a long time the development of an iron and steel industry was little more than a dream, but Brazilian aspirations have become realities with the setting up of the gigantic plants at Itabira, Volta Redonda, and Monlevarde. Many observers have criticised the Brazilian iron and steel industry

* JONES, *op. cit.*

† STAMP, L. D. "South American Prospect." *Geographical Journal*, vol. CXXIII, 1957, p. 339.

on the grounds that it is uneconomic, but output of pig iron and steel has risen steadily from 2 million tons in 1960 to 3·1 million tons in 1965, but this is substantially less than the target of 4·7 million tons for 1965. The Brazilians are intensely proud of their iron and steel industry.

Among the other important manufacturing industries are those producing leather and rubber goods, cement and glass, ceramics and paper, and chemical and pharmaceutical products. Of lesser but growing importance are a number of newly established industries, such as the alcohol, aluminium, and electrical industries.

A large number of industries are concerned with the preparation or foodstuffs. Meat-packing is important, especially in the Southern States; flour-milling is important in the South and in *Río de Janeiro*, where it is based upon imported wheat; nearly 300 sugar-refineries are found in the north; dairy products are produced in the Eastern and Southern States; wine is manufactured, again mainly in the south; while there are numerous tobacco-preparing factories which are fairly widely scattered.

So far manufacturing has been concentrated in the core region of Brazil, *i.e.* in the states of *Río de Janeiro*, *Espirito Santo*, *São Paulo*, and *Minas Gerais*. This area has accounted for about 75% of the total production. The city of *São Paulo*, thanks largely to the availability of hydro-electric power, has become *the* great industrial centre of Brazil. In this burgeoning city of over 3 million people industrial production has increased five-fold in twice as many years! As business booms, a growing multiplicity of industries accrues to this truly fantastic city. *Río de Janeiro* is the second main manufacturing centre of Brazil. Until recently these two cities virtually dominated Brazilian industry and accounted for the bulk of industrial production. While they still lead, and are themselves still expanding, comparatively they are losing ground. A host of other towns, among them *Belo Horizonte*, *Volta Redonda*, *Campinas*, *Juiz de Fora*, and *Sorocaba*, are sharing in the current industrial boom and growing with great rapidity. Outside this core region the only large manufacturing centre is *Porto Alegre*, capital of *Río Grande do Sul*.

TRANSPORT AND COMMUNICATIONS

Brazil has many problems, but transport continues to be the principal one. Taking the country as a whole, communications are still in a very undeveloped state. To be sure, there are many natural factors which present obstacles to, or are unfavourable to, communications: the steep escarpment which cuts off the coast from the interior, the hilly character of much of the country, the heavy, torrential rains, and the thick, widespread forests all present handicaps. These natural disadvantages are aggravated by administrative, economic, and technical difficulties, such as the frequent disputes between the Government and the Railway Companies, the lack of uniformity in the railway gauges, shortage of capital, etc.

In northern Brazil the Amazon acts as a great east-west highway and is navigable by sea-going vessels to beyond *Iquitos* in Peru. Many of the

Amazon's tributaries are also navigable, though often only seasonally, but are interrupted by rapids and falls. The São Francisco offers a convenient route into the interior of the plateau, although, as it cuts through the edge of the Serra, it is broken by rapids and cataracts; these, however, are circumvented by the Paulo Affonso railway. A number of navigable waterways also exist in southern Brazil around Pôrto Alegre. Streams in various parts of the country are used for transport, but, the major waterways apart, the traffic upon them is almost purely of local significance. There is a considerable amount of coastal shipping, which helps to maintain communications between the seaboard states.

Brazil has some 25,000 miles of railway. There are three areas where some kind of network exists: in the cotton and sugar lands of the shoulder, in the coffee region, and in the Southern States. But only in the coffee lands is there an adequate grid. Río de Janeiro and São Paulo are the two great railway hubs, and about 75% of the total mileage radiates from these two cities. Three features of the Brazilian railway system may be mentioned: (1) many short unconnected lines lead inland from the coast; (2) there are no great inter-regional links; and (3) the railways are almost entirely confined to the eastern margins. Theoretically, all the railways are vested in the State, but in practice 78% is owned and run by the Federal Government, 9% by State Governments, and the remainder by private companies who have been granted concessions or leases. The Leopoldina Railway Company, which has nearly 2000 miles of railway in the core region, is under British control.

Highway construction is being pressed on with great vigour; indeed, the current trend is towards road-building rather than railway construction. The core region is best served, but new highways are being built into the interior. There are now some 250,000 miles of roads in the country—a fourfold increase since 1930—but only a small fraction of these are improved highways. There is a national plan for highway construction in operation; this plan envisages 27 main roads, totalling some 24,000 miles in length, which, when completed, will make all parts of the Republic easily accessible. Highway construction is going ahead at a rapid pace, and five great new roads have been built: the Belém-Brasília, of 1400 miles—driven through forest; the Fortaleza-Brasília, of 1140 miles; the São Paulo-Curitiba of 250 miles; the Belo Horizonte-Brasília, of 350 miles, and the road between Brasília and the frontier of Peru which is 2000 miles long.

As a result of the vast distances and the difficulties of land transport, it is not surprising that air transport has progressed by leaps and bounds in Brazil. Aviation plays a very important role in the Brazilian communications system and, as Professor J. A. Steers has said, "the great and new cities of Brazil are primarily linked by air, and not, as in Europe, by road and rail."* But not merely does air transport provide a convenient and speedy means of travel in a land of great distances, it serves also as a very

* "South American Prospect." *Geographical Journal*, vol. CXXIII, 1957, p. 334.

valuable integrating and unifying medium. Were it not for air transport, which forms a nation-wide network, Brazil would suffer regional isolation and run the risk of political devolution on account of the serious lack of land lines of communication. Thus air transport is an active factor in maintaining and developing the political, economic, and spiritual structure of the Republic. Eight domestic airlines run regular scheduled services throughout the country. In addition, Brazil is well linked with her Latin American neighbours, with the United States, and with Europe.

FOREIGN TRADE

A study of Brazil's import and export trade during the past forty years shows it has fluctuated considerably. These fluctuations can be correlated with the world political and economic situation. After the Second World War an appreciable rise took place in both the import and export trade. This reflected, on the one hand, Brazil's rapid internal economic development and, on the other, war-starved Europe's demand for coffee, cocoa, cotton, fruit, etc. Since 1950 big increases in the value of the imports and exports have continued to occur. During the past few years exports have been valued at around £500 million, imports at about £550 million.

The chief exports are coffee, cotton, cocoa, timber, iron ore, fruit, tobacco, sugar, wax, hides, and skins. The principal item is coffee, which has long dominated the export trade and still accounts for about 45% of the total. Imports consist mainly of fuel oils, machinery, motor vehicles, wheat, and industrial raw materials. Note the emphasis upon the prerequisites for manufacturing.

A large proportion of Brazilian trade, about a third to a half, is with the United States. The latter takes a big percentage of Brazil's coffee, and this explains the big volume of trade between them. The United States sends Brazil oil, machinery, and wheat. Britain, Germany, and Argentina are Brazil's other main trading partners.

THE GEOGRAPHICAL REGIONS

In earlier times people spoke of voyaging to "the Brazils," implying that there was not one Brazil but many. The expression contains a large element of truth, for, although politically there is only one Brazil, geographically the country shows some half-dozen areas of extensive size which differ from each other in numerous and often radical ways. Since Brazil is a country of sub-continental dimensions and comparable in extent with regions embracing several different countries, it is not surprising that a number of distinctive units can be discerned.

Maps showing population density and economic development indicate a definite clustered pattern such as we have noted earlier as characterising the whole of Latin America. This clustering is, in part, the outcome of historical factors. Along its 2500-mile stretch of coast the early colonists established many bridge-heads. The degree of penetration inland varied

between place and place and depended upon a variety of factors. But the important and significant fact about this pioneering activity was that it was relatively circumscribed and localised. During some four centuries of development each of these areas of settlement has grown up in relative isolation and developed a degree of detachment. Figuratively, these areas are like islands in the sea, each separated from its neighbour by an expanse of "negative" territory. Social relationships between the various groups might be likened also to those existing between insular communities.

Certain natural factors, notably nearness to the sea, accessibility, sheer distance, the plateau escarpment, navigable rivers, the presence of good soil, mineral wealth, and the occurrence of swamp forest, have either assisted or opposed settlement, penetration, and development. Environmental conditions have, to a very considerable extent, determined the present pattern of settlement. While any basically determinist explanation is to be avoided, there is no doubt that natural conditions and influences have been remarkably powerful and limited human occupation and economic utilisation of many areas. Another aspect of Brazil's geography helps to explain the regional differences. It will be clear from what has been said in the previous chapter concerning the geographical background that Brazil has a wide variety of natural conditions; this diversity explains in part the regional differences.

If geographical factors have been largely instrumental in determining the clustered and discontinuous character of Brazil's social structure, they also go far to explain the regional differences in ways of life, economic activities, and cultural characteristics. R. A. Murray has drawn a useful illustration of these differences; he has written: "The vaqueiro or cowboy of the North-East, driving his lean, tawny zebu through scrub and cactus, is a different personality from his lighter-skinned compatriot, the gaúcho, whose Polled Angus and Herefords graze on the rolling green plains of the far south that face the Argentine border. The northern cowboy is the product of a marginal civilization, a blend of Portuguese and native Indian blood and a hardy example of man's ability to adapt himself to his environment. The gaúcho, while no less hardy, is the central figure in a region whose main industry is farming."*

Geographical influences do not by any means provide the complete explanation of regional differences. Racial and cultural factors have profoundly affected regional characteristics. The people of Brazil are of indigenous or immigrant stock, but there has been considerable intermixture of the two. Moreover, the immigrant peoples are of two widely differing racial types, the white and the black. Although racial blending in Brazil has gone on to a degree scarcely matched anywhere else in the world, each region tends to have a predominant element either European, Indian, or African which gives a social stamp to that region. Thus the

* R. A. Murray, "Two Brazils: I. The North-east Coast," *Geographical Magazine*, Vol. XXV, 1952. Pp. 94-104.

north-east coast region is essentially Negroid, the South essentially European, and Amazonia essentially Indian.

Each racial type, too, tends to have its own characterising cultural features which have coloured the different regions of the country. Two examples may be cited to illustrate this point. In the north-east coast region development was on the lines of the plantation system using Negro slave labour. While slavery has been abolished, the traditional agrarian system has lingered on, and the Negro has remained as the predominant racial element. This area, moreover, experienced fervent missionary activity by the Roman Catholic Church, with the result that religious influences on social life, in education, and on architecture have been strong. Here, then, the old colonial atmosphere lingers persistently and is more emphatically marked than anywhere else in Brazil. In contrast, the South, where more temperate climatic conditions prevail, is largely a land of fairly recent European immigrants, chiefly Italians, Germans, and Portuguese but with groups from many other European countries, who have settled in small farmsteads and who have brought with them, almost intact, their distinctive farming practices, ways of life, customs, and traditions, even to matters of domestic architecture. Socially, the South is very much an area of European sample studies.

The importance of these human differences in fashioning the Brazilian mosaic is well expressed by Murray; to quote him again: "Portugal supplied what has been called 'the solid, primitive, dominant nucleus' of civilized life wherever it exists in Brazil. Round this nucleus has grown a society moulded in varying degrees by the African Negro and the aboriginal Indian. Regional differences have been all the more clearly accentuated by certain migratory patterns of both European and African stock within the country."

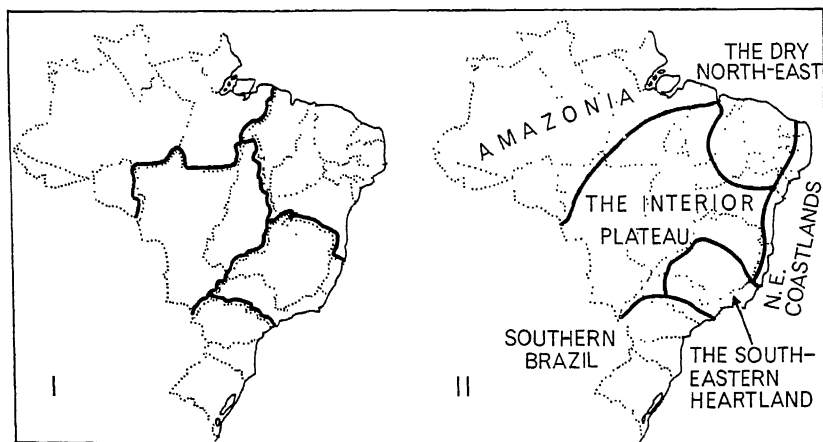


FIG. 94.—Brazil: regions. Map I shows a regional division based on state boundaries: it is used by Brazilian officialdom. Map II shows the regional division adopted in this book.

In sum, "the Brazils" are the outcome of three principal elements: (1) a varied natural background resulting from differences in geology, relief, climate, and vegetation; (2) an historical development marked by economic cycles which led to the successive opening up and development of different areas; and (3) a racial and cultural heritage of various origins which has produced distinctive social differences between one part of the country and another.

As a result of these regional variations we can distinguish six major geographical regions: the South-eastern Heartland, the Tropical Coastlands, the Dry North-east, Southern Brazil, the Interior Plateau, and Amazonia (*see* Fig. 94 (II)).

THE SOUTH-EASTERN HEARTLAND

The South-eastern Heartland, or the Central Plateau of Eastern Brazil as it is sometimes called, is the dominant region of the country. Here, on about a tenth of the national territory, is congregated half of the 66 million people of the republic. The region, which is roughly co-extensive with the States of *Rio de Janeiro*, *São Paulo*, and the southern half of *Minas Gerais*, possesses the largest and most productive coffee lands in the world, rich and varied mineral wealth, a great potential of hydro-electric power, the greater part of the country's manufacturing industry, and a communications system second only, in the entire continent, to that of the *Pampas* of *Argentina*. In addition, it is the most highly urbanised region and contains Brazil's two great metropolitan cities, *Rio de Janeiro*, until 1960 the national capital, the chief cultural centre and the leading port, and *São Paulo*, the predominant commercial and industrial city of the republic.

THE PHYSICAL CONDITIONS

The South-eastern Heartland, embracing a portion of the great Brazilian Plateau and the adjoining *Serra do Mar* and coastal plain, has considerable diversity of physiography. The narrow, discontinuous coastal plains, formerly containing much low-lying land that was periodically flooded—the *Baixada Fluminense*—are backed by the *Serra do Mar*, which forms a great escarpment. The *Serra do Mar* is broken immediately behind *Rio de Janeiro*, and an arm of the sea penetrates inland to form a great embayment. Behind the *Serra do Mar* and running roughly parallel with the coast is a deep, gorge-like valley which the *Rio Paraíba* has cut into the plateau. Beyond this valley the eastern edge of the Brazilian Plateau rises up boldly to form the *Serra do Mantiqueira*, whose peaks exceed 9000 ft. Inland the plateau slopes away gradually interiorwards, presenting a broad, rolling surface which varies between 1500 and 3000 ft in height. Northwards, in the State of *Minas Gerais*, the occurrence of several low mountain ranges, which rise above the general plateau level, give a more emphatic surface relief. Here, in the north, the *Rio Doce* flows from the upland

and cuts across the coastal serra by means of a wider and more gently sloped valley, which gives easier access inland.

Climatically there is considerable contrast between the coastal lowlands and the plateau, the former being hot, moist, enervating, and generally unhealthful, the latter warm, seasonally dry, sunny, and, for the most part, invigorating. The coastal lowlands and seaward-facing slopes of the Serra do Mar are exposed to the influence of Atlantic air masses and receive abundant rainfall—as much as 80 in. annually—which is fairly uniformly spread seasonally. The natural vegetation is therefore tropical rain-forest, which, in its pristine form, is profuse and well-nigh impenetrable. On the plateau the summer months, October to March, are distinctly warm, and occasionally high temperatures are experienced, but the winter season is decidedly cooler, with, in the valleys, spasmodic frosts resulting from inversions of temperature. The greater part of the annual rainfall of 40–60 in. falls during the summer season. The cooler, drier weather of the winter period with its bright sunshine is delightful and, besides offering healthy conditions for humanity, brings distinct advantages for the ripening and harvesting of the chief cultivated crops—coffee, maize, rice, and cotton. The vegetation of the plateau varies appreciably, chiefly in response to the amount of rainfall and soil conditions; for example, on the drier, sandy soils of the north a savanna type of vegetation is characteristic, while on the *terra roxa* soils of the south-west forest is the natural cover.

HISTORICAL BACKGROUND

When, in 1502, Amerigo Vespucci sailed into what is now Guanabara Bay he discovered a small stream which provided fresh water for his crew. To this stream he gave the name *Río de Janeiro* (River of January). Half a century later, after battling with French interlopers, the Portuguese established a fortified settlement (1567), and this may be taken as the founding of the present city of *Río de Janeiro*. Its early function was that of a fortress, a defence point, but its importance was quickly recognised, and when the Portuguese possessions in Brazil were divided into two provinces in 1572 *Río* was chosen as the capital of the Southern Captaincies.

During the early days of the settlement the colonists had to withstand constant attacks from hostile Indians. These Indians referred to the fort as the *carioca*, or “the white man’s dwelling place,” and to this day the inhabitants of *Río* are called *cariocas*. The Indian tribes in the region were of a particularly warlike temper and strongly resisted Portuguese attempts to move into the interior. The first exploratory sally into the highlands was made via the valley of the *Río Doce*.

Gradually Portuguese adventurers fought their way into the highlands and became small farmers and herdsmen. These pioneers became known as *Paulistas* or *bandeirantes*. They, in due time, scoured the plateau seeking Indians to enslave and searching for mineral wealth. In the last years of the seventeenth century *bandeirantes* from *São Paulo* discovered grains of

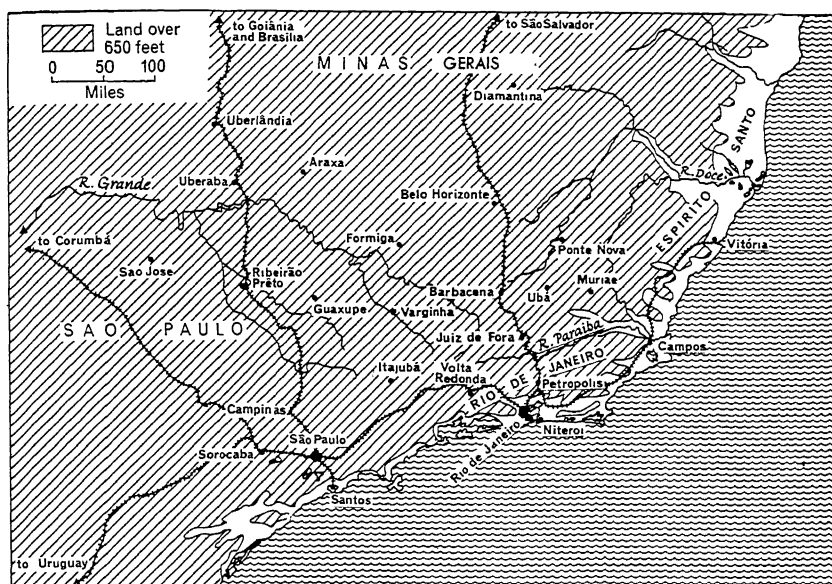


FIG. 95.—The South-eastern Heartland.

gold in the stream gravels of the valleys of the Serra do Espinhaço. The news quickly spread, and a great influx of adventurers from São Paulo and the coastal areas swarmed into the vast territories lying immediately to the north of Rio de Janeiro. Gold was found in numerous localities, a circumstance which led to the area becoming known as Minas Gerais (General Mines).

As a result of the discovery of gold in Minas Gerais, the centre of gravity shifted from the State of São Paulo to Minas Gerais. Previously unoccupied, thousands of gold seekers poured into the territory and many new towns were established. The discovery of diamonds thirty years later (1729) in the vicinity of the present Diamantina led to a further influx of new settlers.

These mineral discoveries were mainly responsible for the peopling of the Central Plateau of Eastern Brazil, for the economic expansion of the region, and for the growth of Rio de Janeiro. Rio became the outlet for the gold of Minas Gerais and thrived, accordingly, on its new-found trade. The Portuguese Government, anxious to control the gold exports, prohibited its shipment from any other port. Moreover, with growth of population in the interior and the need for food and equipment, as well as the building of the colonial roads from Rio into its hinterland, the city's commercial growth was assured.

The end of the eighteenth century brought the mining boom to a close: there followed the abandonment of the mines and a drift of the population elsewhere. With the decline in the gold and diamond enterprises, the livestock industry became the economic mainstay of the highlands. The

coastal lowlands continued to produce, and to prosper upon, sugar, cotton, and maize. For the best part of a century grazing on the large estate system formed the main basis of life on the plateau. And then, towards the end of the nineteenth century, yet another new development—the production of coffee—brought a renewed boom and an even greater measure of prosperity.

The coffee cycle, which led to the development of São Paulo State, though by no means ended, has passed its peak and a more diversified agriculture, together with increasing industrialisation, will doubtless bring to an end the single-commodity economies which have been a feature of the region's past history.

COFFEE: ITS ROLE IN THE ECONOMY

For a period of half a century or so, right up to the Second World War, coffee was the linch-pin, so to speak, of the Brazilian economy. Brazil was the world's largest producer and accounted for almost half of the total world export trade. During the inter-war period approximately 60% by value of Brazilian exports consisted of coffee. During more recent times the dominating role of coffee in the Brazilian export trade has been reduced to between 30 and 40% by value of the total, although in the immediate past years it has, once again, achieved some of its former importance and accounted for about 50% of total export values.

Coffee still remains the great cash crop of Brazil, and "so closely has the whole economic fabric of Brazil been bound up with the coffee industry that when over-production has occurred or has been threatened, the Federal Government has stepped in and financed the holding of, or has purchased and destroyed sufficiently large quantities of the crop to relieve congestion on the international market."★ Such is the measure of the importance of coffee.

More than 2500 million coffee trees grow on plantations covering an area of 8½ million acres. Over 95% of the total production of coffee in Brazil comes from the States of São Paulo, Minas Gerais, Espírito Santo, Paraná, and Rio de Janeiro. São Paulo, however, is the coffee state par excellence: it alone possesses over 1000 million trees and produces some two-thirds of the total Brazilian production. In 1965/66 Brazil produced 34 million bags out of a world total output of 78.2 million bags (of 132.3 lb. each).

Coffee, obviously, still remains of prime importance to Brazil, since, in its function as a money crop, it brings to the country a significant proportion of the revenue required to pay for foreign imports. But in the past Brazil has leaned too heavily upon her coffee crop, and excessive reliance upon a particular commodity is extremely hazardous; a sudden fall in the market price, a bad harvest caused by drought or frost, the ravages of a plant disease or pest, or sudden competition from an unexpected quarter, may place the whole economic structure of the state in jeopardy. Brazil,

★ SHANAHAN, *op. cit.*, p. 148.

having suffered, at one time or another, from hazards of the above kind, has come to place less dependence upon her coffee, and even the great coffee region itself is gradually diversifying its agricultural economy. The great landowners of the South-east Heartland have begun to cultivate other crops, notably cotton, to supplement coffee.

COFFEE CULTIVATION

Coffee has been grown in Brazil since 1774, when it was brought to Rio de Janeiro, but it did not become commercially important until the demand for coffee in Europe and North America grew during the early nineteenth century. The growing popularity of coffee-houses and the alleged medicinal properties of coffee created a market.

From around Rio, where coffee berries smuggled from the Guianas were first planted, planting expanded rapidly up the Paraíba valley. In this area the peak of production was reached in the 1850s, since when there has been a continuous decline, and production in the Paraíba valley at the present time is almost negligible. Wasteful planting and declining yields in the Paraíba valley prevented it from meeting the competition of newer and better-favoured areas in the state of São Paulo. The first centre of coffee production in São Paulo state was the district surrounding Campinas. Coffee planting expanded rapidly here and between the years 1860 and 1865 the area replaced the Paraíba valley as the major producing centre. From Campinas coffee production pushed inland, northwards into Minas Gerais—the south-eastern part of which now forms a major area of production—and north-westwards. In recent times the advance of coffee has been in the main westwards, farther into the interior, and southwards into the state of Paraná. However, there is a limit—almost reached—to the interiorwards expansion of coffee growing, since northwards and westwards it becomes too hot, while in Paraná frost occurrence will set an effective limit to expansion southwards.

Brazil's supremacy as a producer of coffee is not accidental but the result of the happy conjunction of ideal growing conditions; no other country can rival Brazil in its natural advantages for coffee culture. Coffee is grown on the uplands behind the plateau escarpment in south-east Brazil, which provide extensive areas permitting cultivation on large estates or *fazendas*: the coffee trees are, however, almost exclusively planted on sloping ground so that there is good air drainage and less likelihood of chance frosts. Coffee is an exhausting crop, hence soil is important. The region is very fortunate in having soils which have proved to be eminently suitable for the coffee tree. The most common soil is *terra roxa*, derived from weathered igneous rocks; this deep, reddish-coloured earth, rich in iron, which the coffee tree loves, and humus, lies above a gravelly base, hence good drainage is linked with a rich soil. Virgin soil gives abundant yields for a period of some ten to fifteen years, after which increasing soil exhaustion causes declining yields, which make production uneconomical and lead to the abandonment of the plantation and the opening up of new districts.

Climate, in addition to surface and soil, favours the cultivation of coffee. The climatic conditions of the south-east plateau are almost ideal. More so than most plants of commercial importance, the coffee tree is very exacting in respect of climate. Coffee is a tropical or sub-tropical crop, and its desiderata are moderate heat and equable temperatures and moisture throughout the year. The coffee plant is unable to stand fierce, dry heat, and protection from the direct rays of the vertical sun is normally necessary, but the moderate temperatures of the coffee region of Brazil make this unnecessary. The annual rainfall of about 60 in. in São Paulo state gives humid conditions practically throughout the year. The relatively dry season during June, July, and August favours blossoming, while the bright and relatively dry conditions of the winter season assist harvesting between May and August and, also, enable the coffee berries to be dried naturally in the sun instead of artificially, thereby lessening preparation costs. Even so, it should be remembered that the coffee plant is sensitive to drought and cannot withstand a prolonged dry season. On the other hand, it does not like, and is injured by, excessive moisture, and beyond Vitória in Espírito Santo coffee disappears with the increasing humidity and higher temperatures. But of all the climatic conditions frost is the one which is most injurious; like cotton, coffee is very susceptible to frost damage.

Coffee production demands a large labour force for the berries have to be picked by hand, and on each tree they all ripen simultaneously. The labour problem, however, presents little difficulty, since there is an abundance of available labour, thanks mainly to the large number of Italian immigrants who came to the region—often under the sponsorship of São Paulo State—during the latter part of last century following upon the emancipation of the slaves. The demand for labour at harvest-time, however, is so great that the local labour force has usually to be supplemented by employing seasonal migratory workers.

A FAZENDA

The agricultural, economic, and social organisation of the coffee estate or *fazenda* is worthy of note. A typical *fazenda* is essentially a business undertaking run for profit. A landowner, about to develop a new estate, enters into contract with tenant colonists who are to work the land and grow the coffee. Such contracts are usually on a short-term basis—no more than a year or two—and as a result there is a constant flux in the population. The tenant has the same outlook as the *fazendeiro*, or estate proprietor; he is out to make money quickly. The tenant's heart is in the city not in the country, and his labour on the *fazenda* is a means to an end. Just as the tenant has little attachment to the land which provides him with his livelihood, so, too, the *fazendeiro* shows scant sentimental interest in his property or his tenants, though this does not make him a bad employer.

While some of the coffee plantations are of great size and may contain millions of coffee trees, a representative *fazenda* includes about 6 square



[Courtesy: Brazilian Embassy.]

FIG. 96.—A coffee fazenda.

miles of ridge top, hillside, and valley floor. Estates are usually divided from each other by the water-partings on the hilltops and the rivers in the valley bottoms. Usually about half an estate is left in its natural forested state; the other half is cleared for cultivation. The hilltops and slopes are reserved for the coffee trees. The valleys are normally devoted to the growing of food crops or are left for pasture. The accompanying map shows the land use on an estate.

The owner commonly, together with his estate staff of managers, overseers, etc., lives on the estate. The tenants live in villages which are usually sited in the valleys. The *fazendeiro* provides small cottages for the workers and allows them a plot of land upon which they can grow vegetables and keep an animal or two. On the larger *fazendas* there is often a central store, a church, and a school, while some even possess hospitals and cinemas. In the village also are large concrete floors for drying the berries, *engenhos*, or sheds for storing the coffee, and other equipment needed by the industry.

While nowadays specialists are frequently employed to propagate the coffee plants from seed or from cuttings, the work of hoeing and weeding, harvesting and processing is performed by the estate workers, who are paid according to the number of trees they tend—an individual is able to look after some 2000 trees, occupying approximately 6 acres—and at harvesting time according to the quantity of berries gathered. The pruning of the trees, which are kept to a height of about 12 ft, is usually done by gangs of experienced cutters who travel round from estate to estate.

The coffee calendar runs as follows: from approximately January to May the estate worker is occupied with the task of weeding and spraying with insecticides to check the pests, particularly the "broca" or coffee borer, which attacks the trees; at the end of May, after the blossoms have produced their berries, through June and into July and even into August

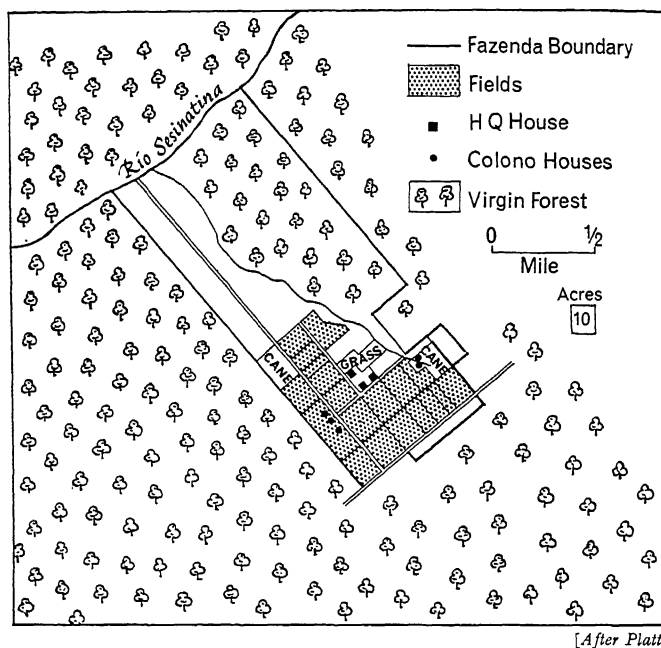


FIG. 97.—Plan of a coffee *fazenda*.

and occasionally later, the workers busy themselves collecting the berries. The latter are then washed and dried on the *terreiros*, or large paved or concrete yards, husked, broken into beans (each berry contains two beans), and sacked into 60-kg (132-lb) bags ready for shipment. The harvesting and processing is carried out during the "dry" season.

THE SHIPMENT OF COFFEE

Excellent growing conditions would be of little value if the means of transport to the coast and port facilities were absent. Since the bulk of the Brazilian coffee crop is exported, facilities for effective export are essential.

An extensive railway net taps all the plantation areas. From São Paulo, which is the great commercial focus of the coffee industry, railways fan out northwards, north-westwards, and westwards, each line serving a definite zone. From the main arteries branch lines project laterally to serve individual areas. Many of the *fazendas* possess private lines. The numerous branch railways feeding the main trunk lines give to the coffee region the

closest railway mesh outside the Argentine pampa in the whole of Latin America. The other railway network, focusing upon Rio de Janeiro, serves the coffee areas of the Paraíba valley and south-eastern Minas Geraes, for which it provides the most convenient outlet.

Santos, Rio de Janeiro, Paranaguá, and Vitória are the chief coffee ports. Together, they virtually control the whole trade. An important railway line links São Paulo, and its great coffee hinterland, with Santos. This approximately 40-mile length of railway is a remarkable feat of engineering for in its descent from the plateau to the coast it has to pass the abrupt escarpment, which presents a formidable and tricky engineering problem involving the use of sixteen viaducts, and thirteen tunnels. A drop of 2600 ft in 7 miles is made possible by using cog-tracks and cables. But down this line comes approximately two-thirds of all the coffee in Brazil. Santos (266,000) is the greatest coffee port in the world. Vast warehouses and sheds, in which the bagged coffee is stored pending shipment, back the wharves of the harbour. As a result of the increasing production of coffee in Paraná State, Paranaguá is beginning to offer serious competition to Santos in the coffee export trade. Rio de Janeiro ships about 15% of the coffee export. Vitória is the natural outlet for the coffee produced in Espírito Santo.

VALORISATION

The coffee industry has not been without its ups and downs. During the period 1885-96, when land was cheap and the demand for coffee was unsatiated, the *fazendeiros* made fabulous profits. Production of coffee leapt upwards: in 1899 it totalled 9 million bags; in 1901, 16 million; in 1906, 20 million. World consumption in 1906, however, was only in the region of 12 million bags, hence over-production brought a crisis. The Brazilian Government, in an attempt to avert disaster, introduced the valorisation scheme by which the State purchased and stored a quantity of the coffee, holding it until such time as the market was ready to absorb it. In 1917, as a result of a huge harvest, a second valorisation scheme was found necessary. This state intervention and help was well-meaning, but, in effect, it encouraged rather than discouraged planting and over-production. As Shanahan concludes: "the valorization schemes were justified in so far as they contributed to orderly marketing; they broke down because they failed to adjust supply to effective demand."*

During the late 'twenties Brazilian production averaged about 27 million bags of coffee. Such over-production, very largely resulting from the indirect encouragement given by the valorisation policy, led to a disastrous drop in the price of coffee. Coinciding with, and, in truth, in part the result of, the world-wide trade depression of 1929-33, the bottom fell out of the coffee market. This resulted, in the 'thirties, in the destruction of nearly 48 million bags of coffee. Coffee was either dumped into the ocean or used as fuel to drive the railways. During the Second World

* *Op. cit.*, p. 148.

War the Brazilian coffee growers were again badly hit, since the big continental market was closed to them as a result of the Allied blockade of Europe. This entailed the destruction of yet further quantities of coffee, and by December 1943 nearly 78 million sacks had been destroyed. After the war coffee exports were curtailed partly as a result of restricted export quotas agreed to by Latin American producers and partly by import restrictions imposed by European countries, who were suffering financial exchange difficulties. However, during the past ten years the demand for coffee in both the United States and Europe has been great and sustained, and this has led to a modification of Brazilian policy of limiting production and, once again, the acreage devoted to coffee has undergone expansion.

OTHER CROPS

The South-east Heartland produces many other crops in large quantities besides coffee. The most important of these is cotton. The depression in coffee led many farmers to change over to cotton, for the world demand for cheap cotton created an expanding market. The crop had long been grown in the North-east region of Brazil, but its cultivation in the coffee region was an innovation. The growing conditions which suited coffee so well also suited cotton, and during the past quarter of a century there has been a tremendous increase in the cotton acreage. So important has cotton become, that it now ranks as Brazil's second export. Three-quarters of the total Brazilian production now comes from the South-east, with São Paulo State as the predominant producer. Production is carried on in three different ways: some of the great landowners grow cotton with hired labour, in the same way as they grew coffee; some is produced by tenant farmers, called *colonos*, who work on a sharecropping basis, cultivating land hitherto devoted to coffee; and some is produced by small farmers in the areas of pioneer settlement to the west of the coffee region. Much of the raw cotton is consumed in Brazil's own textile factories, many of which are located in the heartland area, but there is a considerable surplus for export.

Sugar-cane, which has long been cultivated in the lower Paraíba valley, has been introduced on to the plateau, where it thrives well on abandoned coffee land. The region now produces about half of the total Brazilian output. On the alluvial plains of the middle section of the Paraíba valley rice is grown commercially, and São Paulo accounts for half of Brazil's production. Maize, which is one of the staple foodstuffs is widely grown, but an interesting development is its cultivation in connection with live-stock rearing, which is being established in various parts of the coffee region. In certain areas oranges grow well, but the industry has been troubled by *tristeza*, a root disease. Bananas and pineapples are also produced in large quantities.

Near to urban centres market gardening has developed. The growing of such subsistence crops as manioc, beans, and vegetables is widespread.

MINERAL WEALTH, POWER, AND INDUSTRY

Mining is one of the oldest occupations in Brazil, and was responsible for the initial exploration and opening up of the south-east. The first explorers were looking for gold and diamonds, but these were not found in any quantity until the eighteenth century. Gold and diamonds are now of small importance, although the former is produced from the Morro Velho mine in the Serra da Espinhaço, while the latter are mined in the vicinity of Diamantina. Today the minerals that really matter are iron and manganese. In the Serra are to be found vast deposits of both these important minerals. Iron ores in the "iron-ore quadrangle" of Minas Gerais have been estimated at 23.5 billion metric tons, of which about one-third are compact haematite; these haematite ores are among the very richest in the world, possessing an iron content as high as 68.9%, a factor of considerable importance, since they can be used in the manufacture of steel without undergoing any previous processing by the Siemens-Martin method.

There are two principal producing areas, the Lafaiete mines for the iron and steel plant at Volta Redonda, and those at Itabira, which are carried by the Doce valley railway to Vitória for export—chiefly to the United States. The Companhia Vale do Rio Doce accounts for over half of Brazil's iron-ore production and exports over 80% of Brazilian iron-ore exports, which currently average about 7 million metric tons. The aim is to double this figure within the next few years. The region possesses a number of other valuable mineral ores, especially rich manganese deposits in central Minas Gerais, but including also bauxite in the region of Poços de Caldas in Minas Gerais, lead and zinc in the Ribeira do Iguape in the state of São Paulo, nickel in various places in the region, tungsten and uranium.

While this mineral wealth provides one of the bases for industrial development, power is another. Since Brazil is short of coal, her hydro-electric resources have been developed. Already the greatest concentration of power-generating capacity lies in this region, but growing industrialisation has resulted in an expanding and unsatiated demand for more and more power. A power development programme commensurate with the very rapid rate of industrial expansion and one aimed at preventing power shortages, at least in the near future, has been put into operation. The major project in this programme is the Furnas scheme on the Rio Grande in Minas Gerais. It is the biggest hydro-electric power project in Latin America. When completed (1965) the Furnas Dam, 390 ft high and 1800 ft long and impounding a reservoir with an area of 620 square miles, will contribute just over 1 million kW to the region's generating capacity. The project is conveniently sited where the upper Rio Grande and the Sapucaí, its principal affluent, meet and where the river valleys provide convenient and abundant water-storage capacity. It lies, also, almost

equidistant from São Paulo, Rio de Janeiro, and Belo Horizonte, the chief power-consuming centres. From this central point transmission lines will radiate in three directions, inter-connect with the other already existing electric power systems in the region, and integrate them into a great regional grid. The Furnas scheme is merely the first stage of a major plan to utilise and regulate the whole of the Rio Grande which in its entirety



[Courtesy: Brazilian Embassy.]

FIG. 98.—In the uplands of the State of Rio de Janeiro.

has a hydro-electric power potential of 7 million kW—almost twice the present installed capacity in Brazil.

It is estimated that about 78% of Brazil's industrial output comes from the South-eastern Heartland region. Manufacturing has grown rapidly during the past twenty-five years, and overall production has just about doubled in the past decade. Most of this increase has occurred in the Rio-São Paulo-Belo Horizonte area. The two oldest industries are food-processing and textiles, but they are rapidly losing the dominant position they held prior to the Second World War. Since the War there have been two notable developments in respect of industry: first, it has become greatly diversified and, secondly, heavy industries have emerged.

The region possesses many advantages for industrial development, chief of which are a variety of industrial raw materials, *e.g.* iron ore, timber, limestone, cotton, hydro-electric power, abundant labour supplies, and

many food products. In addition here live about 40% of the country's population, which already forms a sizeable market, constantly expanding.

The most impressive industrial undertaking in Brazil during the past quarter of a century and symbolic of the republic's change-over to a policy of industrialisation is the Volta Redonda iron and steel plant. The construction of the plant, during the middle of the Second World War, provides a landmark in the economic history of Brazil. It is erroneous to imagine that there was no iron and steel industry before Volta Redonda was built; there was, but it was small-scale and scattered. The mining of iron ore and the manufacture of implements, tools, and weapons go back several centuries, and at the beginning of the nineteenth century there were some thirty small foundries located principally in the States of Minas Gerais and São Paulo. Charcoal was used for smelting.



[Courtesy: Brazilian Embassy.]

FIG. 99.—Originally called Villa Rica, the town of Ouro Preto became the centre of gold mining in the eighteenth century; its name means "black gold." It has many fine churches and houses of colonial and baroque architecture and is a treasure house of relics. Today the town is preserved as a national monument.

In the 1930s a National Steel Commission was set up to explore the possibilities of creating a steel industry, and as a result of its findings it was entrusted with the task of planning, building, and organising such an industry. The outcome was the establishment of the National Steel Company and the Volta Redonda plant. A small village on the banks of the Rio Paraíba was selected as a site for the works, partly because it was approximately equidistant from the sources of supply of iron ore (from Minas

Geraes) and coal (from Santa Catarina), and partly because of its proximity to the two greatest steel-consuming centres, Río de Janeiro and São Paulo.

Since Volta Redonda was built the plant has been enlarged: the first expansion was completed in 1956, the second in 1960. The aim has been to raise production to $1\frac{1}{4}$ million tons of steel ingots a year, but the plant's capacity will not be limited to this figure: in truth, plans are already on foot to raise its annual capacity to 2 million tons. Volta Redonda accounts for approximately half of Brazil's total steel output. The Volta Redonda works has exerted an important influence upon its locality: it has resulted in the Paraíba valley, which lay abandoned and derelict for many years following the collapse of the coffee economy, receiving a new lease of life; indeed, it is now the most highly developed industrial area in the whole of the republic.

The iron and steel industry has stimulated the growth of subsidiary and other industries. One of the most important of these is the motor-car industry. A four-year development programme was begun in 1957; in that year the automotive industry produced 30,000 vehicles, in 1958 twice that number, while the target for 1960, 170,000 vehicles, was achieved. Other industries showing notable expansion are the chemical, rubber, and electrical industries.

IMPORTANT CITIES

Brazil's two greatest cities—Río de Janeiro and São Paulo—lie in the heartland region. They are not the only towns in this region, for it is the



[Courtesy: Brazilian Trade Bureau.]

FIG. 100.—View of Río de Janeiro and Guanabara Bay. Note the “sugar-loaf” to the right. The peculiar shapes of these mountains are due to the spheroidal weathering or exfoliation of the crystalline rocks of which they are composed.

most highly urbanised part of the republic, but they tower giant-like above Niterói, Petropolis, Belo Horizonte, Campinas, Sorocaba, Juiz de Fora, Campos, Santos, and Vitória, the other chief cities.

Rio de Janeiro, until 1960 the Federal capital, had a population in that year of 3,307,000. Its setting of water, islands, and mountains is superb and, without any shadow of doubt, it is one of the most beautiful cities in the world. It lies strung out for some 6 miles along the western shores of Guanabara Bay occupying a narrow alluvial strip wedged between the mountains and the sea. *Rio* has now virtually exhausted its restricted coastal site, and any further expansion will be strictly limited. Indeed, land is now having to be reclaimed from the bay for building extensions. *Rio's* early history has already been referred to, but its real growth has occurred during the past hundred years. One important factor in this growth was its function as capital; another was its location close to an economically productive hinterland; and a third was its midway position between the coastal aggregations of the north-east and the south. Since communications by land were poorly developed, much local carrying trade was done by sea and *Rio* was the focus of this sea traffic. Guanabara Bay, too, provided a magnificent natural harbour so that *Rio* developed as Brazil's main port. Today *Rio* handles about 40% of the country's foreign imports and about 30% of the exports. It possesses fine

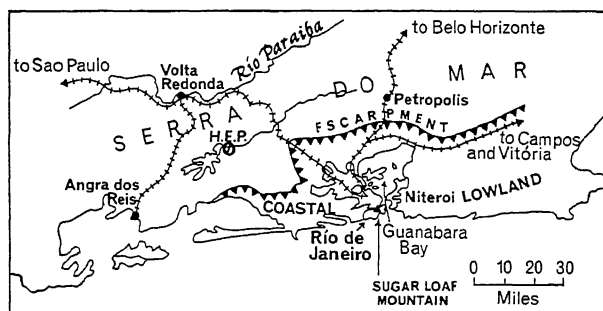


FIG. 101.—Site of *Rio de Janeiro*.

beaches as well as docks, and it is a seaside resort; its Copacabana beach is famed. Within the former Federal Territory, which now forms the State of Guanabara, are to be found numerous industries, including food-processing, textiles, metallurgical and chemical products, timber, paper, and tobacco manufactures.

São Paulo is 253 miles from *Rio*, 40 miles from the coast, and lies at an altitude of 2500 ft. With a population of 3,825,000 it is now Brazil's most populous city and is growing faster than any other city in Latin America. Founded as early as 1554, *São Paulo* remained a small, sleepy, and shabby rural town until just less than a century ago. Then, with the opening up of *São Paulo* State and the rapid growth of the coffee industry,

the town began to grow: 1875, 25,000 people; 1905, 200,000; 1920, 579,000; 1940, 1,000,000; 1950, 2,227,000; 1960, 3,777,000. Today São Paulo is an ultra-modern, glossy city of sprouting skyscrapers; it is restless and dynamic and the Paulistas have the reputation of being the most energetic and hard-working people in the country. Four factors in particular help to explain São Paulo's impressive growth: first, its rela-



[Courtesy: B.O.A.C.]

FIG. 102.—Roof-top view of the city centre of burgeoning São Paulo, the commercial capital of Brazil and the fastest-growing business centre in the New World. Note the contrasting architectural styles.

tively cool and pleasant climate, which stimulates energetic activity; secondly, its position at the focus of an agriculturally productive region, especially in relation to the coffee industry; thirdly, its excellent communications and its link with the great port of Santos, which might be looked upon as São Paulo's "outport"; and, fourthly, the abundant hydro-electric power which has made possible industrial development.

In addition to being Brazil's chief commercial city, São Paulo is also the republic's foremost industrial centre. The town's industrial development has been just as remarkable as its population growth. It accounts for half the total industrial output of Brazil, turning out some 80% of the

republic's production of machinery, electrical apparatus, and rubber goods, and about 60% of the textiles, chemicals, and pharmaceutical products. The range of São Paulo's manufactures is extraordinarily wide, and some 23,000 factories produce practically everything from food to furniture, from paper to plastics.

São Paulo uses Santos (266,000) as a port, but Santos is also the natural outlet for the thriving commerce of the entire state. Santos is famed as the coffee port, but other products of importance shipped from the city include meat and tropical fruits such as bananas and oranges. The port is linked to São Paulo by highway and railway, both routeways being marvels of engineering hewn out of the rocky escarpment of the Serra do Mar. Along this route are situated the important industrial plants of Cubatao and Santo Amaro.

Belo Horizonte (693,000), the capital of Minas Geraes, is the fourth largest town in Brazil. It is a rapidly growing city, the centre of important mining industries and the hub of a rich agricultural region. Among its manufactures are iron and steel goods, cotton textiles, cement making, and diamond cutting. Belo Horizonte is also noteworthy as being Brazil's first planned city.

Juiz de Fora (135,000) ranks as the third largest manufacturing town in the republic: it has textiles industries, notably knitted goods, saw-milling, sugar-refining, and brewing industries. Sorocaba (108,000) is Brazil's fourth most important industrial centre. Situated in an important cotton-growing area, it has cotton textile manufactures, railway workshops, cement and fertiliser plants, and distilleries.

It is impossible to describe all the towns of note in this heartland region, but two others require a mention: first, Niterói (245,000), which is the capital of the state of Rio de Janeiro, very much a residential city; and second, Vitória (70,000), a port of growing importance handling large quantities of iron ore (from the Itabira mines), timber, and coffee, and possessing important sacking, cement, and sugar factories.

THE NORTH-EAST COASTLANDS

The North-east Coastlands of Brazil, though only narrow and small in their total area, form a separate and distinctive region which derives its unique character largely from its position, its historical background, its strongly African ethnic strain, and its economy. The region may be defined as the coastal plains bordering the Brazilian Plateau from the state of Maranhão to Espírito Santo. The importance of the historical factor here is greater than in any other part of the country; it will be useful, therefore, to begin this study with a brief reference to the past.

THE HISTORICAL BACKGROUND

The proximity of this coast, and especially the point of the shoulder of Brazil, to Europe was a crucial factor in its early discovery and settlement.

The city of Recife is almost the nearest point to West Africa and the Cape Verde Islands, the places from which the early explorers set sail. The Brazilian coast was discovered by Cabral in 1500, and the first settlement was established at São Salvador de Bahía. A little later a second colony was set up at São Vicente (1507) and a third, much later, at Olinda (1537). The early settlers on these coastlands were mainly aristocrats from northern Portugal; this was a matter of some significance, for, on the one hand, it resulted in the coast being divided up into *capitanias* or captaincies (each being ruled by a nominee of the Portuguese king) which later developed into the various Atlantic states; and, on the other hand, the feudal tradition of the great estate was introduced into, and became the accepted pattern of land-holding in, North-eastern Brazil.

For several decades, however, Brazil remained relatively neglected and served principally as a source of redwood—the *brasil* from which the country derives its name—but towards the end of the sixteenth century sugar-cane began to be cultivated, and during the seventeenth century Brazil became the world's chief source of sugar. The plantations needed labour, and while the native Indians were pressed into service at first, Negro slaves soon began to be imported in large numbers. An active slave trade flourished, and as a result a new element was introduced into the ethnic make-up of Brazil. At the present day it is estimated that in this region some 12% of the population is Negro, while at least half is mulatto. Noteworthy is the fact that the Negroid element is concentrated in the eastern coastal lowlands south of Cape de São Roque: there are relatively few Negroes on the northern coastlands or in the interior. Even so, the preponderantly dark skins in this region form one of its more obvious distinguishing features.

Another factor contributing to the personality of the region has been the Church. The Roman Catholic Church, which early established itself, together with the Jesuits, who were at once priests, missionaries, teachers, and founders of settlements, exerted a strong and unifying influence in the North-east. The numerous churches, convents, monasteries, and seminaries found in this area are indicative of the role played by the Church in the region's formative period. To this day Roman Catholicism is deeply rooted in the traditions and mode of life not only of the peoples of the North-east but throughout Brazil.

During early colonial times the coast was subjected to repeated attacks by the French and the Dutch, and in the seventeenth century the latter, who were seeking to establish a foothold, had to be forcibly driven out. This struggle with the Dutch invaders had the effect of stirring up local patriotism and helped to create regional loyalty.

As a result of these various factors—accessibility, history, ethnic make-up, religion, and external threat—the North-east developed as a distinctive region, and here “the essence of the old colonial days seems to linger more strongly than in any other part of Brazil”* while “In no other part

* MURRAY, *op cit.*

of Brazil, moreover, are the inhabitants to such a degree conscious of regional loyalty in addition to state loyalty."*

PHYSICAL BACKGROUND

The region embraces parts of the following nine Atlantic states: Maranhão, Piauí, Ceará, Ríó Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahía. It comprises the coastal plains east of the Brazilian massif, which are some 30-60 miles wide usually, but up to 100 miles in places where rivers have cut back into the escarpment. Along the north-western coast are alluvial lowlands, but south of Cape de São Roque relatively young stratified rocks, chiefly sandstones, shales, and clays overlie the crystalline basement rocks. These sedimentaries have been dissected by the eastward-flowing streams to produce low mesas, called *taboleiros*, separating the valleys. Coastal submergence has been responsible for the great estuary of São Luiz and Bahía Bay. Much of the coast is lined with spit and lagoon formations, and along many stretches of coast there are mangroves.

The eastern coast, almost as far north as Cape de São Roque, receives abundant rainfall, 50-80 in., which is at once dependable and well distributed throughout the year. Cool airstreams advancing equatorwards during the southern winter bring moisture to these coasts, and much the greater proportion of the rainfall falls between March and August. During the southern summer there is a relatively dry season when the precipitation is lighter; there is no drought as such. Temperatures are high throughout the year, over 70° F (21° C), with the more northerly parts experiencing 80° F (27° C) and over during the summer months (December to February). The warmth and the moisture give rise to a dense growth of tropical semi-deciduous forest in the natural state, although much of the original cover has now disappeared as a result of many centuries of clearance for cultivation. Here, also, are found deep, dark-red soils, rich and fertile and well suited to the sugar-cane, cacao, cotton, and tobacco which are grown. The moist, forest-cleared lowlands are known as the *matta*. They stand contrasted with higher, drier lands or *agreste*, to the west.

The north-western coastlands, west of Cape de São Roque, approximately as far as Parnahyba suffer from a smaller, more irregular, and less dependable rainfall. Periodic droughts inflict the coastlands as they do the interior. On the other hand, flooding occurs at intervals. São Luiz de Maranhão is sufficiently far west to come under the influence of the equatorial climatic regime, and warm, moist airstreams from the Atlantic bring heavy rains between January and June. The vegetation along most of this part of the coastal zone is savanna and scrub forest.

In the *vales umidos* or "damp valleys" (the valleys watered by permanent streams as distinct from those which flow only seasonally) of the states of Paraíba and Ríó Grande do Norte flooding has presented a serious problem.

* JAMES, *op. cit.*, p. 410.

The water-courses, partly through neglect, have become choked with silt, so that in flood time the rivers spill over their banks and inundate areas of good land, turning them into uninhabitable, malarial marsh. In the past this flooding was held in check by the constant dredging of the rivers, but as this lapsed, so the rivers gained ascendancy. However, during recent years operations have been renewed and several streams have been cleared. The malarial marshes in the locality known as the Recôncavo da Bahia have also received attention and are being reclaimed.

AGRICULTURE

Throughout the tropical coastlands of eastern Brazil similar products are grown. They may be divided into two main groups: the subsistence crops and the cash crops. The former include maize, beans, cassava, and bananas, the basic foodstuffs of the people, which are cultivated everywhere. Since emphasis is commonly placed on the commercial crops, one tends to forget the importance of the staple food products. But it is worth noting that this coastal lowland possesses the highest average population density in the whole of Brazil and some 30 million people—approximately a third of the total population of the country—live here, so that food production for local consumption must loom large in the total cropping. The three great cash crops are sugar, cacao, and cotton; of lesser importance are citrus fruits and tobacco.

Along the north-western coast the insufficient rainfall would preclude most of the plantation crops, and cultivation is heavily dependent upon supplies of irrigation water. During recent decades many dams have been constructed in the North-east, partly, it is true, to control river flooding, but also to provide moisture for the sugar, cotton, jute, and rice which are grown.

The large estate or *fazenda* is the characteristic farming unit, although changes have taken place, and the economic organisation varies from place to place or from crop to crop. For example, the old sugar plantations owned by the aristocracy and worked first by slaves and then by tenant labourers have been largely replaced by companies employing paid workers. Again, while the wage workers on the sugar plantations are more or less permanently attached to a given estate, it is otherwise in the cotton areas; in the latter temporary tenants grow cotton on newly cleared land for great landowners who are primarily cattlemen. Yet again another pattern pertains in the irrigated areas.

Let us now look at the three major commercial crops: cacao grown in the south, sugar-cane in the centre, and cotton in the north.

CACAO

Brazil is the leading Latin American producer of cacao, and ranks second only to Ghana in world output. The cacao beans grown in Brazil are only of medium quality, hence they do not command the high price fetched by, for example, Ecuadorean cacao. Not merely is Brazilian cacao

not of first-class quality but methods of cultivation tend to be primitive, a circumstance which, of course, may explain, or at least may help to explain, the quality. And yet conditions are eminently suited to its production: climate, soils, transport, and labour factors are all extremely favourable.

The tropical lowland with its warm, humid uniform conditions and fertile forest soils provides an almost ideal environment for cacao cultivation. The valleys, too, provide the shelter which is necessary for successful production, as it will be remembered the heavy cacao pod is easily broken off from the tree by wind. Again, most of the plantations are located near rivers so that transport is readily available; river craft carry the beans to the coast for shipment to São Salvador or Ilhéus, the principal collecting and marketing centres. There is, moreover, a sufficient labour supply in spite of the relatively low population density of the cacao lands; since at picking time, when additional labour is required, migrant workers from the dry lands of the interior move into the cacao belt for the harvest season.

The cacao belt extends southwards from São Salvador as far as, and into, Espírito Santo; it lies parallel to the coast in a zone some 50–100 miles wide, the western limit of production being marked by the rising slopes of the plateau edge, for above 600 ft the cacao tree does not flourish so well. Altogether, there are some 80 million trees. The output from these plantations accounts for about one-fifth of total world production. The most important producing areas lie in the hinterlands of Ilhéus, Belmonte, and Caravellas. Production is exploitive in its character: in other words, as soon as yields begin to decline, the plantations are abandoned and new ones established on virgin soils. It is a wasteful and destructive procedure, made possible by the abundance of land and perpetuated by the common Brazilian philosophy of “gathering the fruit without planting the trees.” The disease known as pod rot has affected the Bahían crop, and in the 1960–61 season resulted in a fall in output.

SUGAR-CANE

Sugar-cane is an old-established crop—the first cash crop in fact to be grown in Brazil. It was introduced by the Portuguese, probably from Madeira or the Cape Verde Islands, in the sixteenth century. The crop flourished and brought handsome profits to the Portuguese, a fact which invited others, notably the Dutch, to invade Brazil. There followed, as we have already seen, a struggle between the Portuguese and the Dutch. For three hundred years Brazil remained the world's leading producer of sugar. In the early eighteenth century “the value of its annual sugar exports amounted to £3 million sterling—more than Britain's total annual exports at the time.”*

The Portuguese found the residual soils of the cleared forest land in the

* CAMACHO, J. A. *Brazil*. London: Royal Institute of International Affairs. 1952. P. 29.

matta zone well suited to cane cultivation, and two areas in particular, the lands behind Recife and around Bahía Bay, were rapidly developed. The cane establishments, or *engenhos* as they were called, gradually spread throughout the *matta* until they stretched from São Salvador to Natal. The sugar industry eventually declined. A number of factors were responsible: first, over-production led to a fall in prices, and many planters turned to alternative crops; secondly, the discovery of gold in the interior in the early part of the eighteenth century resulted in many of the plantations losing considerable numbers of their workers; thirdly, the development of the sugar-beet industry in Europe at the end of the eighteenth century introduced a competitive element into the trade; and, lastly, the industry suffered a serious blow with the freeing of the slaves in 1880. Thereafter, world leadership in sugar production passed to the West Indies, which continue to maintain that leadership. They account for about a third of the total world production, as against Brazil's 12%.

At the present day sugar production is confined to the coastal belt south of Natal to the Bay of Bahía, especially on the alluvial soils of the valley bottoms or the residual soils of the lower hill slopes. This region, however, now produces less than the South-east Heartland region. The cane plantations are still frequently in the hands of old Portuguese families and are worked on outmoded lines. Cultivation is carried on in primitive fashion while the sugar mills are small and lack good equipment; there are, in fact, some 50,000 of these antiquated mills still in use producing rapadura (hard, brown sugar). There are also up-to-date plantations using fertilisers and applying irrigation and using modern *usinas* to produce centrifugal sugar, though these are more typical of the sugar lands of the South-east.

Though sugar is no longer of paramount importance, it played a major role in the development of Brazil and especially the North-eastern Coastal Region. To the country as a whole it brought wealth, while it populated the North-east. Moreover, it was largely responsible for the growth of the great towns of the North-east, *e.g.* São Salvador, Maceió, Recife, and Olinda, and, as Camacho has said,* it accustomed the Brazilians to thinking in terms of production for world markets.

COTTON

The third major cash crop, cotton, also has a long history, being introduced in early colonial times. During the eighteenth century, as a result of European demand, cotton began to be grown on some of the old sugar-cane lands, and by the beginning of the following century it was accounting for nearly half of Brazil's exports. Production was boosted as a result of the Civil War in the United States, but later showed a decline. After the Second World War production once more increased, though the greatest developments have been in the southern states of Minas

* *Op. cit.*, p. 29.

Geraes, São Paulo, and Paraná. Cotton now takes up nearly as much land as coffee. But both production and export have varied greatly during the past decade.

The north-eastern states (Ceará, Rio Grande do Norte, Paraíba, and Pernambuco) grow about 36% of the Brazilian output. The bush-cotton grown here, as distinct from the tree-cotton of the sertão, is a short-stapled type similar in quality to the United States upland cotton, but it yields more prolifically, averaging about double the output of the latter. The chief growing area in the North-east lies on the western margin of the former cane belt in the states of Pernambuco, Paraíba, and Alagoas, overlapping in the north into Rio Grande do Norte and in the south into Bahia. From the point of view of production costs Brazil enjoys the advantages of abundant cheap land and cheap labour, factors which help her to compete with a measure of success in the world market. However, almost the whole of the cotton crop of the North-east is consumed in Brazilian factories. Cotton, like sugar, is gradually losing ground in this region.

OTHER ECONOMIC FEATURES

It is obvious from the foregoing account that the economy of the North-east Coastlands is dominated by plantation agriculture, and especially the production of cacao, sugar, and cotton, but there are other aspects of the regional economy which require a mention.

First, this region, by virtue of its coastal location, possesses fisheries. Apart from Peru no country has a highly developed fishing industry. Brazil ranks second with a total catch of some $\frac{1}{4}$ million tons of fish annually, half of which comes from the coastal waters of the north-eastern "bulge." Here barracuda and swordfish are caught in large quantities. One species, the voader, is caught, dried, and despatched into the interior. Sharks are captured, and shark meat is commonly seen in the city markets. Large quantities of shellfish (clams, crabs, lobsters, shrimps) are found all along the coast. Most of the fishing is small-scale and done by primitive methods. Many of the fishermen along the coast use the *jangada*, a raft of Indian origin. This consists of a hull platform made of five or six lightweight logs lashed or pinned together with their butts at the stern so that the craft tapers slightly at the prow. Characteristically they are about 21 ft long by about 6 ft broad. They mount a triangular-shaped sail and are fitted with a centre-board and steering-oar. Usually they carry a crew of three. The fishermen have complete confidence in their *jangadas*, and will sail far out to sea in them; indeed, they have been seen as much as 200 miles from the coast. The fishers of Bahia use lateen-rigged craft.

Mineral resources are few. Petroleum is mined near São Salvador, the wells yielding some 10 million barrels of oil a year. Perhaps the most important mineral resource is monazite sand, which occurs along the coasts of Bahia and Rio Grande do Norte. Thorium, an atomic fuel resource second in importance to uranium, is derived from monazite sand. There



[Courtesy: Brazilian Embassy.]

FIG. 103.—Saveiros is the name given to the fishermen of Bahía, to their lateen-rigged fishing boats, and to the fishing quarter of the port.

is an important salt-extraction industry in *Río Grande do Norte*, the state refining 90% of all Brazilian salt. The salt is obtained by the solar evaporation of ocean water or that of the coastal lagoons, and the towns of *Natal* and *Macau* have notable salt-refining industries. Much of the product is used by the livestock industry of the interior. Manufactures are as yet of relatively slight importance in the region, although there is considerable processing of raw materials, *e.g.* sugar-refining, tobacco-curing, saw-milling, and leather-tanning. The other manufacturing industries, which embrace cotton textiles, the making of footwear, soap and candles, and cement, are located in the coastal towns.

THE PORTS OF THE NORTH-EAST

Along the north-east coast are many towns, mostly dating from colonial times. Towering head and shoulders above the dozen or so important cities are *Recife* and *São Salvador*.

Recife, sometimes called *Pernambuco*, has a population of 968,000 and is, therefore, Brazil's third largest city, ranking after *Rio de Janeiro* and *São Paulo*. A basic factor in *Recife*'s early growth and importance was its proximity to Europe, and to this day it is normally the first port of call for west-bound ships. The town really comprises three parts: *Recife*,

situated on a reef (hence its name) or peninsula enclosing a lagoon which forms the harbour, São Antonio on an island between the peninsula and the mainland, and Boa Vista on the mainland; all three are linked together by bridges. The city is a medley of old and new. Narrow streets and old churches stand contrasted with the wide *avenidas* and modern commercial buildings. Like all the big Brazilian cities, Recife has some impressive modern architecture.

Recife's productive agricultural hinterland and its control of sea and railway routes have made it the great collecting and distributing centre for most of the "bulge" area. By sea a brisk carrying trade by coastal steamers connects Recife with the smaller coastal ports. By land several railways and roads link the city with the inland settlements. Sugar, rum, fruits, vegetable oils, cotton, wax, hides, and timber are the leading exports. Many of these regional commodities have given rise to Recife's manufacturing industries, the most notable of which are the spinning and weaving of cotton, sugar-refining, the preparation of vegetable oils, and the making of cement.

São Salvador, sometimes called *Bahía*, vies with Recife as the greatest city of the North-east. Founded in 1549, it functioned as the capital of Brazil until 1763. It is now the capital of *Bahía* state, and with a population of 808,000 ranks as the fifth city of the republic. A rugged southward-projecting peninsula forms the site of *São Salvador*. The city lies on the steeply sloping side overlooking the deep bay of *Todos os Santos*. As a result of its site the town is built on two levels, the *Baixa* or lower part along the shore, which is the port and commercial quarter, and the *Alta* or higher part, which lies on a small plateau some 200 ft above the other, where are the administrative, residential, and shopping quarters. The two portions are linked together by lifts as well as roads. Like Recife, *São Salvador*'s architecture is a blend of colonial and modern styles. There is a wealth of old forts, churches, and other ecclesiastical buildings, all of which speak eloquently of the city's importance and wealth in colonial times. A social feature of *São Salvador*, which it shares with the other big cities, is the *mocambos* or villages, composed of small thatched houses, situated on the fringes of the urban built-up area. Many of the town workers dwell in these primitive, poverty-stricken, crowded communities. How different are these shabby *mocambos* from the gleaming city centres!

São Salvador today is a great commercial and industrial centre. One of the oldest trading centres in Brazil, it maintains, with ever-increasing volume, its former function. As its plateau hinterland is opened up and developed, so will it grow. It is the largest centre for the trade in cacao and tobacco and has a long list of exports, including, in addition to the aforementioned products, sugar, coffee, castor oil and castor seed, rubber, waxes, hides, timber, and sisal fibre. *São Salvador* has also developed as a great centre of manufacture; there are now several hundred industrial enterprises in the city, including cigarette and cigar factories, cotton mills,

sugar-refineries, distilleries, chemical works, and cement plants. At nearby Mataripe there is an oil refinery. (Fig. 104.)

The other cities of the North-east Coastlands are, with the exception of Fortaleza, considerably smaller. They are nearly all ports serving the various states. Parnaíba (30,000) 70 miles up the *Río Parnaíba* is the collecting and distributing point for the trade of *Piauí* state. *Piauí*, incidentally, only just possesses a coastline—17 miles of Atlantic littoral to be precise. Fortaleza (700,000), capital of the state of *Ceará*, is a centre of coastal trade and fishing and cotton and oil-seed industries. Natal



[Courtesy: Brazilian Trade Bureau.]

FIG. 104—Cubatão oil refinery. Near by is one of Brazil's oilfields. Note the thickly-wooded hill country.

(156,000), capital of *Río Grande do Norte*, exports sugar, cotton, wax, and hides, and has cotton textile and salt-refining industries. Just outside the city is a large airport, used by transatlantic air services. Approximately a hundred miles south of Natal is *João Pessoa* (139,000), state capital of *Paraíba*. *Olinda*, a few miles north of *Recife*, is worth noting because of its historic past. An old colonial capital with many old churches, some built by the Dutch, monasteries, and seventeenth-century houses, *Olinda* is a town of much charm. *Maceió* (146,000) is the chief port and capital city of *Alagoas* state. *Maceió* retains its colonial air, but has developed various industries. *Aracajú* (95,000), capital of *Sergipe*, is a port of note, with cotton mills, sugar-refineries, and tanneries. The last town in this catalogue of noteworthy centres is *Ilhéus* (40,000), 120 miles south of *São*

Salvador, important principally as a collecting and exporting centre for cacao, since in its hinterland is produced two-thirds of all the cacao grown in Brazil.

THE DRY NORTH-EAST

West of the coastal zone in the shoulder of Brazil is a region of upland country which suffers from periodic droughts. Because of its dryness, the area is not suited to agriculture, except locally or where irrigation is practicable, and it is characteristically a pastoral land. Physically, climatically, and economically the country stands in marked contrast to the adjacent humid coastal lowland with its tropical plantation agriculture. There are, moreover, sharp contrasts in the human geography: whereas the coastlands are well populated and the people are strongly Negroid, the interior is sparsely peopled and the population predominantly white. But it is the drought factor that is paramount in distinguishing the region; upon it hinges the whole life of the area.

THE SERTÃO

This dry interior country is called the *sertão* by the Brazilians. The term has no precise or specific meaning, and is not easy to define. Its significance and meaning have probably been explained best by Professor P. E. James, who has written: "The word *sertão* is not easily translated. The *sertão* is not a kind of vegetation. It is not just virgin wilderness in the North American sense of the word. It is not unexplored: the 'backlands' of Brazil have been tramped over again and again for four hundred years, and again and again they have yielded wealth to any strong enough, brave enough, and persistent enough to discover and exploit their hidden resources. It is not empty: all over its vast expanse are small villages and towns lost in leagues of unoccupied land. But no description of the things physically present in the *sertão* can give the full content of the word; for it is also a state of mind, a belief in the existence of hidden resources, and of a people endowed with unusual insights and powers. . . . To the Brazilian of the twentieth century this quasi-mystical feeling for the backlands is not an allurements. The great cities of the settled regions offer advantages, real or imagined, that draw people to them. Even from the *sertão* there is a trickle of migration toward the settled areas. Yet the Brazilian of the cities is never sceptical of the possibility that someone else will find the key to unlock the riches of the backlands and start a great inland trek, a *marcha para oeste*."*

The *sertão*, then, is something more than a distinctive natural environment. But for practical purposes we shall use the term to cover the backland areas of the North-east, the dry hilly uplands with their natural vegetation of dry forest, brushwood, and grasses.

* "The Sao Francisco Basin: A Brazilian Sertao." *Geographical Review*, vol. 38, 1948, pp. 658-61.

SURFACE FEATURES

The Dry North-east region covers nearly 250,000 square miles and includes parts of the States of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia.

Topographically it is a hilly, upland region. The surface configuration of low mountain ranges, groups of hills, and isolated monadnocks is the result of long-continued erosion and denudation. Originally layers of sandstone covered the basement of crystalline rocks, but these have now been almost completely stripped off to reveal the crystalline rocks. The plateau now exhibits a characteristic peneplaned surface. Resistant masses forming mountain ridges form what are known as *serras*.

The rivers of the North-east are very irregular in flow. Though flooding on occasion, the water-courses dry up when drought comes. Apart from the São Francisco, the major river flowing through the region, the chief streams are the Acu, Mossoro, Capeberibe, Bebiribe, Vasa-Barris, Real, and Itapicuru. The São Francisco, in spite of its great size and extensive drainage basin, is very erratic, with variations between high and low water of up to 30 ft. In the region of the great bend it flows for some 300 miles through one of the most arid areas in Brazil, and during the dry season all its affluents in this section of its course disappear. Many of the rivers of the North-east are broken by rapids and falls and flow through gorges in parts of their courses. The streams of this region, which were originally developed upon the overlying sedimentary strata but now flow over the crystalline basement, provide an interesting example of a superimposed drainage pattern.

CLIMATE AND VEGETATION

The interior lands of the North-east are distinguished by the irregularity and uncertainty of the rainfall and their partial aridity. The total annual precipitation varies between approximately 30 and 60 in. This is not unduly low, but four factors affect its efficiency. First, the rainfall is highly erratic and completely undependable in its occurrence; secondly, the rain tends to come in a few violent downpours of brief duration; thirdly, the high temperatures result in a high rate of evaporation; and, fourthly, the disposition of the relief produces rain-shadow effects.

Most of the precipitation falls between December and April, but in any given locality its occurrence and amount varies widely from month to month and from year to year. Periods of drought alternate with heavy rains. Only the upstanding *serras*, which by reason of their elevation receive more regular rainfall and a greater total amount, may be said to be reasonably well watered and may be likened to oases in the *sertão*. A long, dry, hot season prevails between May and October when the skies are clear, the sun burns down, the temperatures are over 80° F (27° C), and the intensity of evaporation is high.

The climatic conditions cause the region to be subject to the recurring

calamities of flood and drought, and between them the North-east is sorely tried and frequently hard hit. When such natural disasters occur, as, for example, in 1958, when widespread drought seized the area, thousands of people quit the region.

Over most of the region the natural vegetation is a kind of scrub-forest, called *caatinga*. This consists of drought-resisting vegetation of thorny shrubs and dwarf trees. In some moister areas it forms dense, intermingled, and sometimes impenetrable, thickets; in the more arid localities the twisted trees disappear altogether and cacti predominate. In aspect the *caatinga* varies greatly between season and season. During the rainy period the vegetation is green and luxuriant and grasses grow; as the dry season sets in the verdant aspect disappears as the grasses wither and the trees lose their leaves; and at the end of the dry season the *caatinga* has a bare, harsh, desolate, and hostile look about it. Large areas of *caatinga* have been cleared, sometimes as a result of the need for charcoal, sometimes to assist the growth of pasture grasses.

In certain localities other vegetation types occur. Along many river margins a fringe of gallery forest is present. In such areas of moist alluvial soils are found the valuable carnauba and oiticica palms which yield a fine vegetable wax. On the *serras*, where rainfall is more abundant, the vegetation is more luxuriant. Originally they were covered with a fairly dense mantle of semi-deciduous forest, but only small fragments now remain intact, since the *serras* attracted settlement and man quickly cleared the land. On the eastern margins of the region a sub-xerophytic vegetation occurs in the form of woodland, carrying tall trees, with a vigorous undergrowth. This woodland, known as *agreste*, forms a transition zone between the coastal forest and the xerophytic *caatinga*.

DROUGHT PROTECTION

"The troubles of the N.E. plateau area lie in the fact that the rains are badly distributed as to seasons, as to districts, and as between one year and another."* Thus, Dr. Shanahan summarises the essential problem of the North-east Interior. The frequent periodic droughts which plague this area play havoc with the local economy. When, in the past, these droughts have occurred starvation, famine, and death have been the lot of those who did not migrate. The peoples of the North-east, however, have a reputation for tenacity and have tended to remain on their scorched scrubland even to the bitter end, and often those who left have returned as soon as conditions permitted. During recent times the North-east has been unable to maintain its population, and for several years now a steady trickle, periodically swelling to a stream when the rains have failed, has moved out of the region. During the drought of 1952 a quarter of a million people left the north-east for São Paulo and Río de Janeiro. When another great drought afflicted the area in 1958 a further great surge of emigrants occurred.

* *South America*. P. 134.

The Federal Government early appreciated the problem of the North-east, and half a century ago (1909) set up the Federal Inspectorate of Drought Protection Works, a body charged with the investigation and solution of the problem. Since irregularity of occurrence and unequal distribution of the rainfall are the basic causes of the drought, the obvious approach was to make the best possible use of such precipitation as fell by constructing dams to store the water for use during dry periods. Furthermore, such dams would help mitigate the floods which also ravaged the region from time to time.

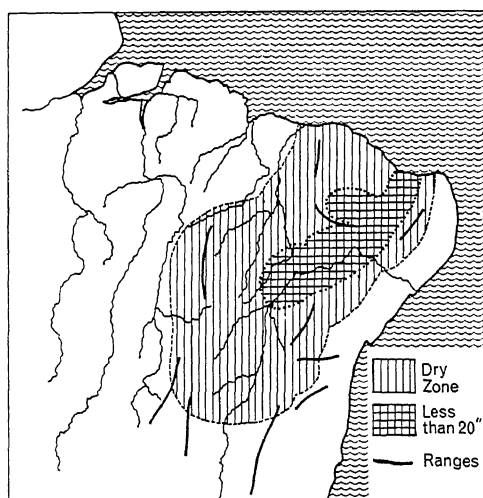


FIG. 105.—The arid area of North-eastern Brazil.

Well over a hundred dams have been built, with a total capacity of some 100,000 million ft^3 . Two of the recently constructed dams, the Mae d'Agua and the Curema Dams, have 23,600 million ft^3 and 25,400 million ft^3 capacity respectively. In addition to the numerous dams constructed by the Government, many smaller ones have been built by private individuals to serve their own properties. In the São Francisco Valley a "Brazilian T.V.A." scheme has been launched. Already under way, the scheme, when completed, will provide an example of complete river basin management, including irrigation, flood control, power, and transportation. It includes a vast increase in the reservoir capacity which was planned to reach 8 billion cubic metres by 1960, more than double the capacity which the North-eastern region had in 1955; more than a hundred miles of irrigation canals which are already in service; and the building of the great Três Marias dam, whose power plant will produce 520,000 kW, was completed towards the end of 1960. The completion of these schemes will bring appreciably nearer the full control of the São Francisco river which has long preoccupied the Brazilian Government,

not only in respect to the development of the immense valley, which potentially is one of the most fertile areas in the whole country, but also for the purpose of normal navigation.

In order to create some measure of economic stability in the area and help solve the problem of poverty, the Inspectorate has concerned itself with a wide range of activities, including the promotion of agriculture, transportation, and public health. In 1932, for instance, an agronomical section (the Commission of Complementary Services) was established to investigate the problems peculiar to the Dry North-east, to carry out experimental work on crops, and to promote agricultural education. An interesting aspect of its work is its promotion of fish-farming; selected species of fish are being introduced into the artificial lakes which have been created by the dams. These lakes are well suited to pisciculture, and eventually the fish will provide a valuable adjunct to the local food supplies. Fish-farming is very much in its infancy in Latin America but is growing gradually.

THE ECONOMY

In the *sertão* stock-rearing is the major industry and most of the people are directly engaged in the herding of animals or indirectly dependent upon the industry. Some 5 million cattle and a similar number of goats graze the *sertão*. The cattle are a hardy breed, in which the zebu strain is prominent, but inferior in quality. The cattle are raised on vast estates, for the land is held in the main by great landowners. The ranches are organised on extensive lines, and each forms, to a very large extent, a self-sufficient unit. On the one hand, there are the cattle herders or *vaqueiros*, colourful, vigorous, individualistic cowboys, mainly of Indian blood, who live a semi-nomadic life and who scorn cultivation of the land; on the other hand, there are the *moradores* or settlers, attached to each estate, who till the soil and produce the food crops for the ranch. Although the estates normally produce most of their basic food requirements—maize, beans, and manioc—they depend upon the *serras* for such commodities as coffee, sugar, and tobacco. Goats, which can subsist on the dry vegetation of the *sertão*, are widely reared in the North-east; the goat is a useful animal to keep in such dry lands, for it provides milk, meat, hair, and hide. They provide a valuable source of livelihood for many of the poorer peoples of the region.

Cattle-raising in the Dry North-east is a difficult and hazardous undertaking. In the past, before the building of reservoirs had begun appreciably to lessen the risk of heavy losses, the industry suffered greatly periodically. The fluctuations in the cattle population from year to year were indicative of the acuteness and over-riding importance of the water problem. As the dry season progressed, the rivers shrank to rivulets and then ceased to flow, the wells and water holes dried up and the vegetation, withered and sapless, provided no food. When the last reserves of fodder and water had given out the exhausted cattle died in tens of

thousands. The construction of reservoirs has done much to mitigate the effects of severe drought in many areas, and livestock losses are now less disastrous. The water-supply problem, however, has by no means been completely solved.

The surplus cattle of the region are normally marketed in the *matta* of the coastal region. But hides, rather than meat, form the chief export. Goatskins are also an important item in the export trade, and the region counts as one of the main sources of goatskins entering international trade.

While the tending of animals forms the principal occupation, there are two other activities of note—the cultivation of specialised crops and the collecting of vegetable products. Within the *sertão*, as we have already seen, are certain elevated areas blessed with fairly abundant rainfall. These *serras* support relatively dense populations who live by cultivating the soil and producing chiefly coffee and sugar. The farmers of the *serras*, in addition to growing a variety of crops for their own needs, produce commodities for sale to the pastoralists of the *sertão*. A more recent development has been the production of market-garden crops on riverside localities near to towns, a type of cultivation styled *cultura de vazante*. Finally, a number of minor industries connected with indigenous plants have been developed. The carnauba palm yielding wax, the oiticica palm giving oil, the manihot and mangabeira producing rubber, the cashew tree producing nuts, and the mamona plant, from which castor oil is derived, are all valuable plants found in the *caatinga* and exploited to a greater or lesser degree.

THE CARNAUBA PALM

Of the various wild forest products the carnauba palm (*Copernicia cerifera*) is the most important and deserves special mention. The carnauba or Brazilian wax palm is a tall, slender, stately tree, some 50 ft or more in height, carrying a crown of fan-shaped leaves. It is peculiar to North-east Brazil and until its recent successful acclimatisation in Ceylon was unique to the region. A drought-resistant species, the carnauba palm grows wild over extensive areas of the North-east, occurring in groves which often line the roads and intermittent streams. To the Brazilians it is known as "the tree of life," because of its multifarious uses. The trunk, roots, leaves, sap, and fruit, as well as the fine vegetable wax it yields, are all used. The trunk is used for constructional timber; the leaves make excellent thatching material, and are also used in the making of basketry and matting; the young leaves give a fibre of great strength and toughness which is used for making rope; the sap is used to make a kind of tapioca and a fermented drink; the fruit is edible for humans and also provides a useful animal feed-stuff; and a wax is obtained which has a wide range of applications.

The most valuable part of this very useful tree is the film of wax which coats the underside of the leaf. This wax, because of its hardness, high melting point, and high gloss, has a very varied range of uses. It is employed in the manufacture of floor, furniture, and motor-car polishes; in

cable-making and electric batteries; in gramophone records, film, and carbon paper. Its uses are constantly being extended.

Harvesting takes place during the dry season, when two cuttings of leaves are made. The leaves are left to dry in the open air for three, four, or five days; this allows the wax to dry out, but in the process as much as a quarter of it is lost. Next the leaves are taken to a threshing shed, where the operation of threshing, to loosen the wax, is done by hand; this primitive method involves the loss of another quarter or so of the wax. The wax dust is then melted, strained, and pressed and then allowed to cool and solidify. Finally, the wax is broken up and bagged ready for export.



[Courtesy: Brazilian Embassy.]

FIG. 106.—Carnauba palm.

Although carnauba wax has been collected for over a century and the industrial demand for it has increased steadily, its production and processing are still of a primitive nature. However, efforts to organise the cultivation of the palm are now being made, and large plantations now exist in the states of Ceará and Piauí. Moreover, the Ministry of Agriculture has interested itself in the industry and is undertaking technical research upon the problems of processing the wax. Also it is giving some thought to the problem of conserving the natural resources of the carnauba palm. So far the industry has been almost purely of the exploitive kind, and wholesale destruction of the wild palm has occurred. This is illustrative of the typical attitude of mind of the Brazilian; as Shanahan says: "these people find it difficult to change the habit inherited from untold

generations of ancestors of taking without thought for the morrow what nature offers at hand."*

During recent years the annual output of carnauba wax has amounted to about 12,000 metric tons. Most of it is exported to the United States and Western Europe.

THE BABASSU PALM

The babassu (or babaçu) palm (*Orbignia speciosa*), which yields a high-grade vegetable oil, grows over an extensive area, running in a south-westerly direction from the moist fringes of Amazonia into the semi-arid *caatinga*, as far as the north of Mato Grosso State. Groves of the palm, occurring in dense stands of as many as 200 to the acre, are found in the Maranhão plain and along the banks of the Itapicuru and Parnaíba rivers. In Maranhão State alone some 1000 million palms are believed to exist. The crop potential is enormous and the value of the oil would run into hundreds of millions of pounds sterling at current prices, although its value would fall greatly were it to be produced in greatly increased quantities.

Production at present centres around the valley of the Ríó Itapicuru, and only a small amount of oil is produced. The nuts are collected as they fall to the ground. They are broken by hand with sledge hammers, each worker extracting about 18 lb of kernels a day. One of the major problems of the industry lies in the hardness of the nuts: they are extremely difficult to crack. Moreover, many of the nuts are wasted because the relatively soft kernel, which contains about 75% of the oil, is smashed when the nut is broken. Recently, however, experiments have been undertaken to devise a nut-cracking machine which will break the shell of the nut without damaging the kernel. If cheap processing could be introduced the whole pattern of the vegetable-oil industry might be changed, and Brazil might find its economy revolutionised by the development of an oil industry larger than its coffee industry.

Babassu oil has many applications. It can be used in the preparation of edible fats, such as cooking fat and margarine; in soap manufacture; in the making of explosives; it can serve as a light lubricant; and it provides an excellent substitute fuel for diesel engines. Nor is the husk without its uses, and various by-products can be extracted from it. A pilot plant was set up a few years ago at Queiru in the State of Maranhão; it treats 100 tons of babassu shell daily and is now producing acetic acid, alcohol, glycerine, and tar.

SETTLEMENT AND COMMUNICATIONS

Because of the semi-arid conditions and limited facilities for agriculture and because of the traditional ways of life, pastoralism and subsistence cultivation, population is thinly spread and settlements of an urban character few and small. The settlement pattern is one which shows a fairly

* *Op. cit.*, p. 140.

close attachment to sources of water supply, a natural association in view of the semi-arid climate and the constant threat of serious drought. The *serras* form the most closely settled areas; these are often reminiscent of well-populated islands in an uninhabited sea. Small settlements are frequently found in splendid isolation, separated from their nearest neighbours by extensive areas containing few or no permanent habitations.

Internal communications in the Dry North-east are poorly developed, although a road-building programme begun by the Inspectorate of Drought Protection Works in 1930 has resulted in the construction of some 5000 miles of highway. The railways, except in the case of the line from Salvador to Paulista, do not penetrate far inland. In view of the sparseness of the population, the smallness of the traffic, and the vastness of the area, it is unlikely that a railway net will ever develop. The future of the communications system must lie principally with improved road transport. It is unfortunate that the rivers, and particularly the São Francisco, which on the map appears to offer a major line of communication from the coast to the interior, are of such restricted value as highways. The São Francisco is accessible to river craft as far as Piranhas, above which gorges and cataracts obstruct navigation.

The chief towns are Teresina (75,000) on the Parnaíba River, capital of the state of Piauí; the twin towns of Juazeiro-Petrolina, in the middle São Francisco basin, an important market centre; and Carinhanha, in the upper part of the São Francisco valley, which is the terminus of the highway from Salvador.

FUTURE PROSPECTS

It seems likely that the Dry North-east will continue in its role as a pastoral region for many years to come. Locally, developments may occur in a response to mineral deposits, increased exploitation of carnauba wax, and more intensive cultivation of cotton, but development is likely to be slow.

Although the opening up of the *sertão* will be hindered by the shortage of agricultural labour, by primitive and inefficient methods of farming, by the shortage of capital, and by the inadequacy of the communications, the real key to the expansion of the regional economy will continue to be the water problem. The chief need is to minimise the perils of drought. Successful organisation of the water resources of the region will be the surest way of promoting expansion and development and securing prosperity.

Physical handicaps, such as isolation, areal vastness, and climatic risks, are not the only obstacles to progress. Certain social factors, such as the system of the large estate, widespread poverty and the low standard of living, and the illiterate and unenterprising nature of the inhabitants, also militate against progress. The Federal Government is aware of both conditions and is doing all it can, within its resources, to tackle the problems of the region. But progress and achievement are necessarily slow. "Because of the need for a co-ordinated over-all attack on the problems,

as opposed to the traditional local and piece-meal attack," wrote James,* "some have suggested the setting up of a regional 'authority' for the specific purpose of planning a more effective use of the resources and putting its plans into operation." The launching of the Brazilian Government's various Plans and the setting up of the São Francisco "T.V.A." suggest that the Federal Government is moving in this direction.

SOUTHERN BRAZIL

Southern Brazil consists of the three southern Atlantic states of Paraná, Santa Catarina, and Río Grande do Sul. Differing in many respects from the rest of the country, these three states form a distinctive geographical region which is commonly and most conveniently called South or Southern Brazil. This distinctiveness is due to four main reasons: first, it is climatically different, being distinguished by its temperate character; secondly, it has a wider variety of resources than most of the other regions; thirdly, it is predominantly settled by immigrant peoples of diverse nationalities; and, fourthly, it is an area characterised by many different types of farming.

Only in comparatively recent times has the region been actively colonised, in spite of its attractiveness for settlement. Progressive exploitation and development are now taking place, and Southern Brazil is likely to play a much more important role in the republic in the future. In view of its great potentialities, the region faces a future of great promise.

PHYSICAL SETTING

The three states enjoy a coastal location, and very few areas are situated more than 300 miles from the sea. Proximity to the sea has been an important factor influencing settlement, and the chief cities lie on or near the coast.

Variety of topographical conditions characterises the region. A portion of the Brazilian Highlands comes within the region and forms what is known as the Paraná Plateau, a rolling upland averaging about 2000 ft high. In Santa Catarina much of the land rises to 3000, and in parts 4000, ft; in contrast, very little of Río Grande do Sul lies more than 1000 ft high. From the crest of the plateau escarpment which borders the coast, the plateau, and therefore the drainage too, slopes westwards. Just to the north of the city of Porto Alegre the Serra do Mar peters out and the plateau edge swings westward. Approximately one third of the region may be designated true plateau country. Most of Río Grande do Sul consists of rolling hill country or flat plains.

Along the east coast of Paraná and Santa Catarina is a narrow alluvial lowland, swampy in places. It does not form a continuous coastal plain, for tongues of high land extend eastwards to form steeply faced promontories. The plains are best developed around Paranaguá, São Francisco,

* *Latin America*.

and Tubarão. South of Tubarão the coastal lowland widens, and in *Río Grande do Sul* there is a broad zone of alluvial plain embracing numerous lagoons, the largest of which is the *Lagôa dos Patos*. These lagoons and the coastal waters form a fisherman's paradise. Inland in *Río Grande do Sul* is a landscape of hilly uplands developed on the crystalline rocks, with considerable areas of lowland in the river valleys.

While the Jacuí and other smaller streams in *Río Grande do Sul* flow eastwards, most of the drainage is westwards. In *Paraná*, *Santa Catarina*, and northern *Río Grande do Sul* the plateau is composed of lava, and into this resistant diabase the rivers have cut deep canyons. Along the courses of the rivers occur some of the world's most spectacular waterfalls, *e.g.* the *Guayra* and the *Iguassú Falls*. The rivers and falls of this region offer enormous possibilities for the generation of hydro-electric power.

CLIMATE AND VEGETATION

Climatically the region is in the nature of a transition zone between tropical and temperate conditions. Viewed in relation to the rest of Brazil, this southern portion is distinguished by its essentially sub-tropical character. Temperatures, as elsewhere, correspond with elevation. In coastal localities and in the river valleys temperatures are high in summer and winters are warm. The uplands are cooler, and a considerable daily range gives quite cool nights. Frosts, and even occasional snow, especially in the higher parts of *Santa Catarina*, are experienced in winter. Frost is never found along the coast. There is a fairly abundant rainfall, approximately 60 in., which is more or less uniformly distributed throughout the year. Two departures from this general statement might be noted: first, there is a summer maximum in the coastal zone and, secondly, the southern part of *Río Grande do Sul* receives a smaller total annual rainfall. The temperate nature of the climate and the uniform seasonal distribution of the precipitation distinguish South Brazil climatically from the adjacent regions to the north, which are appreciably hotter and have a definite seasonal rainfall regime.

Southern Brazil has a wide variety of vegetation types. But these notable differences result not so much from variations in the amount and distribution of the rainfall, which vary very little over the whole region, as from differences in temperature and soils. Along the coastal lowlands, north of 30 degrees S., tropical forest (*selva*) occurs. The escarpment slopes and the southward-facing slopes of the high land overlooking the Jacuí valley are clothed with semi-deciduous forest. On the plateau, covering much of *Paraná* and *Santa Catarina*, is a broad belt of *Araucaria* or *Paraná pine*. The total reserves of *Paraná pine*, reckoned at 200 million trees, form the major forest wealth of Southern Brazil. South of the *Pelotas* river the pine forest gradually gives way to grassy prairies. In southern *Río Grande do Sul* are vast areas of natural grassland together with considerable stretches of artificial pastures which have been created as a result of forest clearance. The occurrence here of grassland, in an area

of plentiful and well-distributed rainfall which ordinarily should support forest, has never been adequately explained.

Diversity of soils, a product of the geology, climate, and vegetation, is another notable feature. *Terra roxa* on the diabase, prairie earths on the grasslands and alluvium in the river valleys provide a variety of good soils. Considerable areas of Southern Brazil are of great fertility, and the region has become one of the most productive agricultural areas in the country.

NATURAL RESOURCES

Because of its transitional character between regions essentially tropical and essentially temperate, Southern Brazil enjoys a variety of resources. While Paraná produces coffee, cotton, rice, maize, flax, tobacco, tung oil and tropical fruits, as well as yerba maté from the maté plantations and timber from the pine forests, and Santa Catarina maize, rice, manioc, potatoes, yerba maté, and timber, Rio Grande do Sul is Brazil's major wheat-growing state and an important producer of maize, beans, and potatoes, as well as the major cattle-, sheep-, and pig-rearing state.

The Paraná pine forests form one of the three great forest areas of Brazil. From the point of view of economic exploitation it is the most important of them all. Brazil's lumber industry has reached its maximum development in the three states of Paraná, Santa Catarina, and Rio Grande do Sul. In addition to the large reserves of soft wood, Southern Brazil also possesses some valuable hardwoods and thickets of yerba maté.

Southern Brazil is also important for its mineral and power resources. Brazil's most important, indeed almost only, coal deposits are found here. Though the reserves are low-grade in quality, they are of considerable significance to Brazil. Of great potential value are the hydro-electric resources of the region. Of the metallic minerals, magnetite deposits of great value occur in Paraná and Santa Catarina, copper in Rio Grande do Sul, and small quantities of lead, tin, and tungsten, all of which are worked, are found in Rio Grande do Sul.

The wealth from field, forest, and mine has led Rio Grande do Sul to rank third among the manufacturing states of Brazil, while the town of Porto Alegre comes next after São Paulo and Rio de Janeiro as a centre of industry.

POPULATION AND SETTLEMENT

Portuguese occupation of Southern Brazil was never substantial. During the colonial period a few groups moved southwards; these either carved out cattle estates on the grasslands of Paraná or set up mining centres to pan the gold from the stream gravels of the coast. Both Paranaguá and Curitiba originated as centres serving the early mining communities. Later, a number of forts were established in the coastal zone which subsequently developed as military garrison towns, e.g. São Francisco, Florianópolis, and Porto Alegre. But by the end of the eighteenth

century settlement remained scattered and the population small. Because of this, comparatively few people of Portuguese descent are to be found in Southern Brazil today.

Settlement dates, in the main, from 1822, the year of Brazilian independence. During the nineteenth century European colonisation was encouraged and large numbers of Germans, Italians, and Poles entered the region. The first contingent of Germans arrived in 1824 and was settled in the new colony of São Leopoldo, just to the north of Pôrto Alegre. During the next thirty-five years more than 20,000 Germans sought a new home in Brazil. Between 1870 and 1890 there was an influx of Italian immigrants, who settled in *Río Grande do Sul*, mostly to the north and west of the German colonies in the Jacuí valley. A third important element was Polish, the Poles settling predominantly in *Paraná*. Because the territory was virgin country and no one held prior claim to the land, these European settlers were able to establish individual farms for themselves by cutting the forest and clearing the land. To this day Southern Brazil is characteristically a region of small landowners.

More recent immigrants include Azoreans, Dutch, Czechs, Ukrainians, and Japanese. These incomers do not, as a general rule, merge themselves into the existing population; rather do they form distinctive groups or pockets who tend to preserve their national characteristics just as the nineteenth-century German, Italian, and Polish immigrants did. This is well illustrated by house types. Each colony tends to build a reproduction of the dwelling typical of the homeland, and there are houses in Southern Brazil which would appear to have been transplanted in their entirety from, for example, Germany, Holland, or Italy. There are other unmistakable signs, *e.g.* language, religion, distinctive agricultural pursuits, which reflect each community's national culture.

It will be apparent that a large proportion of the people of Southern Brazil are not true Brazilians in the ethnic or cultural sense, but it is precisely this "foreign" element that has given to the region its distinctive cultural character. In due time this European element will, doubtless, be assimilated, though the absorption may well prove to be slow and protracted. Urban growth and increasing industrialisation will probably offer the quickest means of achieving it.

There are over 10 million people in Southern Brazil, distributed among the three states as follows: *Paraná* approximately 3.5 millions, *Santa Catarina* 2 millions, and *Río Grande do Sul* nearly 5 millions. The density of population is about 45 per square mile. Thus, in spite of its attractiveness for settlement and its wide variety of natural resources, Southern Brazil remains still an under-populated region. The territory could probably easily accommodate four times its present population.

In *Paraná* the population is mainly congregated on the plateau. Apart from *Paranaguá*, the coastal zone is poorly settled. The principal town and capital of *Paraná* is *Curitiba* (502,000), a town which has doubled in size during the past decade. In *Santa Catarina* and *Río Grande do Sul*, on

the other hand, the population clusters are on the lowlands and in the valleys. Pôrto Alegre (803,000) is easily the largest town in Southern Brazil, but Blumenau and Florianopolis in Santa Catarina and Pelotas and R  o Grande in R  o Grande do Sul have populations between 50,000 and 100,000. "Proximity to the sea," wrote Professor C. F. Jones,* "has been a potent factor in locating the principal cities near the coast. In the interior, the trunk railway from S  o Paulo to Montevideo has developed a number of smaller centres and also enhances the value of the coastal towns by its four principal transverse branches."

The development of Paran   State received a serious setback in 1963 when a great, uncontrollable fire ravaged huge areas, engulfing several towns, destroying thousands of farmsteads, and wiping out coffee plantations. Hundreds of thousands of people were compelled to flee before the conflagration, while many lost their lives.

AGRICULTURE

Geographically, one of the most significant and characterising features of Southern Brazil is the diversified nature of the farming. The typical type practised by the Brazilian peasant is the *roca* system of shifting agriculture—a type common to many parts of Latin America, as we have noted time and time again. This essentially primitive system, at once wasteful, inefficient, and unstable, is found in many parts of Southern Brazil. Land is cleared, usually by burning, and then cultivated by extensive methods. There is no ploughing of the land; seed is planted by means of a digging stick. When the soil has lost its fertility the *caboclos*, as the shifting peasant cultivators are called, move on and clear a fresh patch. Maize, manioc, sweet potatoes, and black beans are the chief crops grown under this system. The prevalence of the *roca* system in Southern Brazil is, says J. A. Taylor,† "a fact very much at variance with the popular and text-book opinion of land use in this region."

In the areas cultivated by most of the immigrant colonists very different types of farming prevail. Taylor likens such areas to "islands of progressive, stable agriculture in a sea of *roca*." Each national group has introduced its own ideas, methods, and techniques of farming and, as far as the environmental conditions have permitted, has continued to farm in the manner characteristic of its respective homeland. The Germans, the Italians, the Dutch, and the Japanese, for example, have developed quite distinctive types of farming.

The German colonists, who usually concern themselves with the cultivation of maize and potatoes and the raising of cattle and pigs, carefully manage their farms, following a system of crop rotation and making good use of organic manure. The German pattern of land use is harmoniously related to the sequence of physical conditions—valley floor, lower slopes, middle slopes, and hilltops, utilised, in turn, for growing crops, pasturing

* *South America*. P. 424.

† "Farming in South Brazil." *Geographical Magazine*, vol. XXIX, 1956, pp. 460–70.

cattle, shifting cultivation, and fuel and forage for pigs. Where Italian colonists have settled, as around Caxias, vine growing and market gardening are distinctive and distinguishing features along with rice growing. The Italian farm economy is often highly reminiscent of the intensive agriculture carried on the Plain of Lombardy. Similarly, the recent Dutch settlers, who established a colony at Castrolandia in 1951, have introduced farming practices which reflect those of Holland. Importing pedigree Holstein cattle, they have built up a dairying industry which is run partly on a co-operative basis. But, says Taylor, their distinctive contribution has been their integration of stock-farming with crop-growing and their adoption of a system of rotational intensive crop cultivation using farmyard manures for fertiliser. The Japanese again, with typical assiduity, have developed small, intensively cultivated farms in the district around Assai, in northern Paraná, where they grow maize, coffee, beans, and cotton.

These examples of types of farming illustrate not only the wide variety of agriculture carried on in the region but also indicate the possibilities for a rich and rewarding agriculture if the land is efficiently farmed and properly nursed. Most of the colonists have been trained in the arts of land husbandry, and they have approached the problem of farming at a higher level than that of rank exploitation. Taylor has summed up the position thus: "This fascinating miscellany of new agricultural colonizations in South Brazil contrasts with the traditional Brazilian pattern. Here stable commercialized types of agriculture, geared both locally and nationally to the Brazilian economy, have taken firm root; a development which suggests that in this part of the country, at least, a relatively continuous prosperity may at long last be achieved, in contrast to the repetitive sequence of temporary prosperity and rapid decline which has so often been the story of Brazilian farming elsewhere."

The rolling prairie country of the southern portion of *Río Grande do Sul* stands contrasted with the agriculture of the plateau and the coastlands. These grasslands support the most important livestock industry of the country. The state of *Río Grande do Sul* has over 7 million cattle (about 20% of the Brazilian total), over 5 million sheep (almost 50% of the total), and over 3 million pigs (nearly 20% of the total). The cattle and sheep are raised on great *estancias* very similar to those found in Uruguay and Argentina. Here, then, is a type of farming—commercial grazing—which is radically different from that of the typically small-scale, intensively cultivated, farming practised by the immigrant farmers in other parts of Southern Brazil.

AGRICULTURAL PRODUCTION

A remarkably wide variety of temperate and sub-tropical crops is grown. Already one of the most important agricultural areas of Brazil, the region is playing an increasingly important role in the country's agriculture and contributing an ever-increasing proportion to the state's total

agricultural production. Although specialised types of farming, such as plantation agriculture and commercial grazing, occur and are important, the region is, perhaps, best designated as an area of general farming.

Maize is the leading cereal crop, and is important in all three states. About one-third of the total Brazilian production comes from the South. Good yields of maize are harvested on newly cleared ground. Besides being a staple foodstuff, it is used as a feed for pigs and cattle. The major areas of pig and poultry farming coincide with the chief maize-growing districts. Rice is widely cultivated on the coastal lowlands, particularly on the wide river plains opening out on to the *Lagôa dos Patos*, where modern methods of cultivation are applied which take full advantage of the ample supplies of irrigation water. Rice production has expanded greatly here during the past half century, and Southern Brazil now accounts for approximately one-fifth of Brazil's total output. Rye, which is more especially suited to a cool climate, is exclusive to Southern Brazil. It is chiefly cultivated in *Paraná*, where it is preferred to other cereals by the Polish settlers. Wheat growing, too, is virtually restricted to Southern Brazil. The total acreage amounts to about $\frac{1}{2}$ million acres, most of it in *Río Grande do Sul*, where the great *estancias* of the south often have considerable areas devoted to wheat.

Beans and cassava, along with maize, form the staple food crops in the South, as they do in the tropics. Beans, chiefly the black type, are grown in eastern *Paraná*, eastern *Santa Catarina*, and northern *Río Grande do Sul*. The cassava or manioc tuber is widely grown, usually in small patches and with little attention, but eastern *Santa Catarina* is the most important area of production. Potatoes, confined mainly to the cooler uplands, are an important crop, largely due to their high yield per acre. Climatic conditions are by no means ideal for potatoes, however, and their cultivation has been made difficult by potato diseases. The Ministry of Agriculture during recent years has been developing disease-resistant seed potatoes. Large areas are devoted to tobacco, especially in *Río Grande do Sul*, which is a major producer of light cigarette tobacco. Southern Brazil accounts for over a third of total Brazilian production. Other crops include sugar-cane on the coastal lowlands, coffee in northern *Paraná*, where the frost hazard is slight, tung, and ground-nuts. In addition, large quantities of fruit, especially oranges, bananas, and grapes, are produced. The wine industry has developed enormously, thanks mainly to the Italian immigrants, who brought with them the art and science of wine-making. Viticulture is almost confined to Southern Brazil, the state of *Río Grande do Sul* alone producing approximately 80% of home production of wine.

THE PASTORAL INDUSTRIES

Not only does Southern Brazil possess the most important livestock industry in the country but it also seems likely it will continue to predominate. Cattle-raising was established early on the open grassy ranges of *Río*

Grande do Sul. The cooler climatic conditions were more suited here to the development of a pastoral industry, yet all-the-year-round grazing was possible. Initially developed by Portuguese gauchos, the industry gradually grew and, particularly during the past fifty years, has reached considerable proportions.

In earlier times the chief product was *xarque*, or dried beef. Dried and salted, beef was exported to tropical Brazil and the West Indies. The first refrigerating plant was set up in 1914, and two years later the first frozen meat was shipped abroad. Since that time the *xarqueadas* or beef-drying works have begun to give way to the *frigoríficos* or freezing and chilling plants. Little frozen or chilled meat is exported overseas today; most of the export trade is in canned meats. There are important packing plants at Pelotas, Rio Grande, and Santa Anna do Livramento.

The climate in Rio Grande do Sul is fairly well suited to sheep, although temperatures are a little too high for the production of high-grade fleeces. The Government has done, and continues to do, much to improve the sheep by selective breeding. The wool clip, almost entirely from Rio Grande do Sul, is about 20,000 tons a year. Most of it is consumed in Brazil's textile mills.

Pigs are widely raised in the South; Rio Grande do Sul alone possesses more than 3 million swine. Many of them run wild in the forests foraging for themselves; periodically they are rounded up for slaughtering. Others are fattened on maize. Requiring little care, pigs are a useful animal for the small farmer, and they find a significant place in the system of general farming characteristic of the eastern parts of the states. They are found outside the main areas of pastoral farming. Salted pork is exported to northern Brazil.

FOREST INDUSTRIES

Covering much of Paraná, Santa Catarina, and extending into northern Rio Grande do Sul, is an extensive belt of pinewoods. The predominant tree is the Paraná pine (*Araucaria angustifolia*), an imposing tree, tall, straight, and branch-free. Growing, in maturity, up to 130 ft high and attaining a diameter of up to 6 ft, it yields a soft, flexible, easily worked timber. Estimated reserves are 130 million pines in Paraná, 60 million in Santa Catarina, and 10 million in Rio Grande do Sul. This pine forest constitutes the largest and most accessible stand of commercial softwoods in South America. Commercial exploitation is a comparatively recent development, but pinewood exports now account for about three-quarters of Brazilian timber exports. The industry has developed rapidly, and now there are over 3000 saw-mills in Southern Brazil, of which 2200 deal with pine alone. The mill at Três Barras, in Santa Catarina, is the largest in South America, and possesses a wood distillery. Technological research has led to important developments in the timber by-product industry and a wide range of products, such as alcohol, tar and its derivatives, pyroligneous acid, "pres-to-log" (a solid fuel made from wood refuse), etc.,

are now being turned out. Paranaguá and São Francisco are the principal timber-exporting ports.

Another important forest industry is the exploitation of yerba maté or, as the Brazilians call it, herva mattee. The plant (*Ilex paraguaiensis*) grows widely over the plateau in groves or thickets. When cultivated on plantations, the tree is kept to shrub size. Harvesting is carried out during the winter season, between April and August. Many of the farmers of the east move into the forests and plantations at this time of the year to undertake seasonal work as pickers. Curitiba is the chief processing and packing centre of yerba maté. The total annual production is in the region of 100,000 tons, of which about half is exported, most of it to Argentina and Uruguay, but some to Paraguay and Chile.

MINING AND MANUFACTURE

Southern Brazil's mineral resources, apart from coal, are not of any great importance. The coal resources, however, though limited, are of considerable value, since they provide almost the only coal in the country. Altogether there are nine fields, three in each state, viz. São Jerônimo, Butiá, and Río Negro in Río Grande do Sul; Cresciuma, Urussanga, and Lauro Muller in Santa Catarina; and Río do Peixe, Barra Bonita, and Barbosas in Paraná.

The coal occurs in thin seams and contains much clay. It is of low-grade quality. The more recently developed fields in Paraná (and also those in São Paulo State) contain better-quality coal. A central processing plant has been set up at Tubarão designed to handle 2 million tons of coal a year. Coking coal is shipped to Volta Redonda for the iron and steel industry. The annual coal output is between 2 and 3 million tons; reserves are estimated at 5000 million tons.

Iron ore (magnetite) occurs in Paraná and Santa Catarina, but is little exploited as yet. Copper lodes exist at Camaqua and Seival in Río Grande do Sul, and new plants for the treatment of copper ores have been established here during the past decade. Some lead is mined in northern Paraná, and a new lead-smelting plant has been opened up at Brejaúvas. Wolframite is also mined in Río Grande do Sul.

Apart from mining and industries based upon forest resources, such as saw-milling and paper-making, or farming, such as meat processing and wine-making, there is little general manufacturing industry. Manufactures, true, are developing at a rapid rate in the country as a whole, but the South still has relatively little industrial activity. Most of the industry is concentrated in Río Grande do Sul, where Pôrto Alegre, Pelotas, and Río Grande are significant manufacturing centres.

PÔRTO ALEGRE

The largest and most important town of Southern Brazil, Pôrto Alegre (803,000) ranks sixth among the cities of the republic. It lies within the Lagôa dos Patos, at its northern extremity, but dredged channels provide

access for smaller ocean-going vessels. The original site of the town was a small promontory at the end of a ridge of hills. Close by several streams converged, and these navigable waterways gave Pôrto Alegre easy contact with its hinterland. The city now lies in a productive area and has grown into an important commercial centre.

Pôrto Alegre is, in addition, a major industrial centre, ranking after São Paulo and Río de Janeiro. Its industries reflect its agricultural and pastoral hinterland. The processing of food, the tanning of leather, and woollen manufactures are its most characteristic industries. Among its other manufactures are furniture, footwear, farm equipment, chemicals, and wine. Pôrto Alegre is growing rapidly, and like so many of Brazil's burgeoning cities, is developing a skyscraper complex.

Since Pôrto Alegre is an inland centre rather than an ocean port, Pelotas and Río Grande compete for the trade of Río Grande do Sul State. Both are important ports and centres of industry.

THE INTERIOR PLATEAU

The Interior Plateau consists of a vast upland of savanna-like grasslands covering some 500,000 square miles. Broadly speaking, it is the area lying south of the Amazonian selvas and west of the Río Paranaíba-Paraná. It comprises the states of Mato Grosso and Goiás together with the southern part of Pará and portions of Minas Gerais and Bahia. The area is sometimes referred to as the Central-West.

The region is little developed and scantily peopled and plays little part in the life of the country. Why is this? Primarily it is the result of isolation and inaccessibility. Vast in areal extent, remote from the sea, and inadequately served with transport facilities, either natural or man-made, the region is at once cut off and handicapped. It remains very much a *terra incognita* to most Brazilians.

So far, the Interior Plateau has remained a neglected region; apart from a certain amount of nibbling round the edges, as it were, the area has remained little exploited. And yet it is not without possibilities. It offers the largest area of relatively unused grazing land in the world, much of it providing reasonably good pasture. It possesses considerable and varied mineral wealth, some of which has already been sporadically exploited, but which, in the main, awaits systematic development. Its agricultural potentialities, though not easy to assess, probably hold out considerable promise locally, particularly if water supplies can be engineered and communications provided.

TOPOGRAPHY

The great Brazilian Plateau, of which the Central-West region forms a part, consists of a very ancient stable block. It is possible that the plateau, or most of it, has remained above the sea since the earliest geological

times. Large-scale uplift appears to have occurred in early Tertiary times, since when the land has constantly remained above sea-level.

Most of the region has a surface configuration of tabular uplands which have resulted from the denudation of nearly horizontal sediments which lie on top of the basal complex of crystalline rocks. The plateau surface, in general, is remarkably level. The relief consists of broad, flat-topped uplands, called *chapadoes* by the Brazilians, separated by broad, flat valleys. In southern Pará and northern Goyáz the tablelands give way to the less-uniform hilly uplands. In south-western Mato Grosso the rolling plateau descends to the low-lying, flat, alluvial lands of the upper Paraguay basin. These plains, which are flooded during the rainy season, are called the Pantanal.

Since the Brazilian Plateau is tilted and slopes towards the continental interior, most of the drainage of the Interior Plateau flows northwards. The Serra dos Divisoies, as the name implies, forms the major water-parting or divide. Apart from the headwaters of the Paraguay, which flow southwards, the tributaries and headwaters of the Tocantins, Xingu, and Tapajóz, and some of those of the Madeira, drain northwards. These rivers have had a prolonged period of time in which to cut their valleys, which are well developed, deeply cut, comparatively broad, and fairly well graded. The entire drainage system is concentrated in a relatively few powerful rivers.

The soils over much of the plateau are poor. Since the predominant parent rock is sandstone, the weathered material produces porous, dry, sandy soils. These are greatly inferior to the soils developed on the crystalline rocks in southern Goyáz, and especially those derived from the volcanic rocks. Leo Waibel, describing the Planalto Central of Brazil, has drawn attention to the sandy and gravelly accumulations on the Planalto and to the occurrence of *canga*, i.e. ferruginous residual matter which forms a pan in the red and yellow lateritic soils. Surface accumulations of this kind are extremely permeable and allow water to sink through easily. The result is the accumulation of ground water beneath the surface deposits but above the bedrock, which results in many springs issuing on the hill slopes. The springs, in turn, help to feed the rivers and to maintain stream flow right to the end of the dry season.

CLIMATE AND VEGETATION

In general, the climate is subtropical. The continental situation induces high temperatures in summer, and the summer months are very hot. In places day temperatures have attained an absolute maximum of 104° F. Winters are usually cool, and in the higher parts towards the east delightfully so. Nocturnal radiation makes the nights refreshingly cool, sometimes even chilly. Frost, however, is unknown. A noteworthy feature of the winter half of the year is the variability of the temperature, and on the plateau of Mato Grosso wide, and even violent, fluctuations of up to 40° or 50° F within 48 hours are experienced on occasions.

Rainfall is distinctly seasonal. A dry season during the winter months (June, July, and August) characterises the whole region. Cuiabá, in the basin of the upper Paraguay, receives less than an inch of rainfall during these three months. Similarly, Pirenópolis in the Planalto Central gets under 1 in. The summer months (December, January, and February), in contrast, have a singularly heavy rainfall, usually between 40 and 60 in. In general, the rains begin in September, gradually gain in frequency to reach their peak in the summer months, and then decrease with marked rapidity during April and May. The rainfall is torrential in type.

The markedly seasonal rainfall regime determines the character of the vegetation. Because of the long dry season the plateau is unsuited to forest growth, and a savanna type of vegetation covers most of the region. The interior grasslands are sometimes called *campos* or *campo*. A number of varieties or sub-types of savanna are distinguished, but, in a broad fashion, two main kinds may be said to occur: *campo cerrado*, a growth of grasses and bushes with scattered, stunted, twisted trees, and *campo limpo*, consisting of low bunch-grasses and herbaceous plants but free of trees. Gallery forest often edges the rivers and on certain higher ridges patches of forest are also to be found.

SETTLEMENT

The Interior Plateau is, in general, very sparsely peopled: over most of the region the population averages under one person per square mile. All told, there are less than 1½ million. Goiás, with an area of some 225,000 square miles, has a population of about 890,000; Mato Grosso has an area of 447,000 square miles, but only about 360,000 people. The smallness of the total population is due in part to the environmental conditions, but especially to remoteness and inaccessibility.

Never, at any time, was the indigenous Indian population large. There are, however, extensive areas inhabited only by native Indians, widely dispersed in small groups, who live a nomadic existence hunting and collecting. These roving Indians inhabit the more remote areas; they are a backward, suspicious, and often hostile people.

An interesting and rather surprising element in the population of this interior region is the Negro. Groups of Negroes or groups showing a strong strain of Negro blood occur in various places. Their presence is explained by the fact that in earlier times Negro slaves were brought in to work the early mines. These Negroes have increased in such numbers that they constitute the chief or even total element in many of the settlements.

White men early penetrated this region, though they did not come in large numbers nor as colonists. Initially the Portuguese came as slave raiders, scouring the plateau for Indians, whom they wanted for work on the plantations. The "Paulistas" during their slave-raiding expeditions found gold—first at Sabará in 1690—and the lure of gold led them deeper and deeper into the interior. By 1718 the westward advance had penetrated 1500 miles inland, and the discovery of gold in the centre of the

plateau of Mato Grosso led to the founding of the city of Cuiabá.* Shortly afterwards, in 1727, diamonds were found and, later still, emeralds. These discoveries led to a great influx of people and the establishment of other settlements. Most of the early strikes proved to be of an ephemeral nature, and by the end of the eighteenth century many of the richer deposits had been worked out. But in the meantime the interior had been opened up.

Today most of the settlements and most of the towns lie on the highland divide—the Planalto Central and Planalto de Mato Grosso—which runs across southern Goiás. Already long important as a grazing district, the watershed is now being actively colonised. Settlers from the crowded coastal zone are steadily migrating into these uplands, clearing land and establishing farmsteads. The Central Government is encouraging the colonisation of this area, and has set up an agricultural colony some 90 miles north of Anápolis. Gradually, therefore, the fringe of pioneer settlement moves inwards.

MINERAL WEALTH

The early finds of gold and diamonds led, as we have noted above, to the first great influx of people into the interior. By 1732, some 40,000 men were feverishly engaged in the search for diamonds.† Diamonds are widely spread in Minas Gerais, Goiás, and Mato Grosso. For a century and a half Brazil was the premier diamond-producing country in the world, but, following upon the exhaustion of the richer sources and the opening up of the South African mines, the industry gradually declined, although some thirty years ago about 10,000 men were still employed in it. Today, the industry is mainly concentrated in the eastern margin of the region, notably around Diamantina in north-eastern Minas Gerais and around Leucões in south-eastern Bahía. The latter area is chiefly concerned with the production of carbonados or black diamonds, which are used for industrial purposes.

The gold and diamonds, whose exploitation profoundly influenced Brazil's development, are now of little importance. But there are indications that the Interior Plateau has other mineral wealth of great potential value. The manganese deposits at Urucum, 15 miles south of Corumbá, in Mato Grosso, are said to be the richest in the world and very extensive, but their development is likely to be retarded by the problem of transport over so great a distance. The nickel deposits at Niquelândia are estimated at 10 million tons and believed to be the greatest in the world. These ores are now being worked, and a processing plant has been erected at Niquelândia. Deposits of chromium, copper, lead, titanium, bauxite, mica, and quartz are also known to exist in Goiás. The modern industrial application of quartz has led to a great demand for the mineral, and Brazil is the world's foremost producer. Most of the rock crystal comes from Goiás, where it is found in alluvial deposits and in the schist

* JONES, C. F. *South America*. P. 415.

† *Ibid.*, p. 494.

and quartzite rocks. Some 18,000 people are engaged in the search for, and mining of, quartz.

THE GRAZING INDUSTRY

Commercial grazing is the dominant occupation of the Interior Plateau. The Portuguese introduced cattle into the *campos* quite early on to meet the food needs of the mining communities. The industry has thus a comparatively long history. Although it has never developed into an industry of major importance, except relatively in respect to the region, it has enjoyed a long-continued importance and become the chief source of income.

Some 10 million head of cattle—about one-sixth of the Brazilian total—are reared on the *campos*. A feature of the industry is its almost complete dependence upon the natural pastures, for there is little supplementary feed available. The cattle are found mainly in the southern and eastern portions of the region, *i.e.* in Goiás and southern Mato Grosso. Two areas, however, are of special importance: the cooler uplands of southern Goiás and the plains of the upper Paraguay River in the extreme south-west of Mato Grosso. Of the two areas, the former is the more important.

There are many handicaps to commercial grazing on the *campos*. The grasses are coarse and harsh and of low nutritive value and, except when they first sprout, provide only moderate pasturage. Burning is often carried out to rid the ground of the hard, dry stubble. Foot-and-mouth disease, Texas fever, and other diseases attack the animals and take a heavy toll; moreover, ticks and other insects, besides impairing the health of the cattle, burrow into their skins and give rise to sores, so that, after the animals are slaughtered, their hides are imperfect and consequently have a lower market value. The dry season may bring excessive drought, and as a result of the lack of water the animals may suffer acutely or die of thirst, as not infrequently happens.

Such natural handicaps affect both the numbers and quality of the stock. In general, the beasts are of a poor standard, large, lean, and bony. Most produce hides, and flesh that is fit only for jerking. The native cattle, though of poor quality, developed a stamina to withstand the high temperatures and a certain resistance to tropical diseases. Thus the problem was to improve the native stock to yield a better flesh while retaining the animals' high resistance to heat and disease. To this end Indian zebu cattle were imported and crossed with the native breed. This has done something to raise the quality of the animals, though they still leave much to be desired. Higher-grade cattle can be raised only by the introduction of pure-bred stock and improving the pastures and feed. Recently a new breed, the Santa Gertrudis breed, has been developed from the crossing of English Shorthorn with Indian Brahman cattle. "Years of crossing, selection, and inbreeding were necessary," writes Earl B. Shaw,* "to develop

* *World Economic Geography*. New York. 1955. P. 261.

the new breed, which combines the best qualities of the Shorthorn and the Brahman. The Brahman's high tolerance of heat, humidity, poor pastures, and resistance to insects and disease is combined with the Shorthorn's fine beef-producing quality and quiet temperament. The combination may give hope to cattlemen in the tropical savanna and the steppe lands."

The *campos* grazing industry still finds its main market in the mining centres and local towns, but, because of the swelling population of Brazil, increasing numbers of steers are being moved from the ranches of Mato Grosso, Goiás, and Minas Gerais into São Paulo State for fattening prior to slaughter. Currently, some 750,000 beasts are sent to São Paulo annually.

There is very little production of beef for the world market. Two factors militate against such a development—the quality of the flesh and the difficulties of transport. It is necessary that the stock be improved if the *campos* region is to become a significant producer of cattle products for overseas markets. It is equally necessary that transportation facilities should be improved. Road and railway developments, still sorely needed, would help to open up markets. Summing up, it may be said that the *campos* is an area of potential, rather than realised, commercial grazing. Until there is a shortage of grazing land elsewhere or until the economic demand becomes sufficiently great, the opening up and fuller utilisation of these grasslands will proceed slowly.

THE PLANALTO

In southern Goiás and central Mato Grosso there are extensive areas of the plateau lying between 1500 and 3000 ft high. These "high plains" form what is known as the Planalto. Most of the settlement in the Interior Plateau occurs here, as a map showing towns and communications clearly indicates.

The uplands of southern Goiás have long been devoted to cattle-raising, the industry originating in the first place in response to the demands of the early mining communities. The grazing industry has developed here to a greater extent than elsewhere on the plateau interior because the climatic conditions are more favourable and the area is less remote than other portions of the Central West.

After commercial grazing, subsistence agriculture is the chief activity. Although there is a small production of tobacco, cotton, and coffee, as cash crops, cultivation is predominantly concerned with the growing of crops for local needs, especially maize, rice, manioc, beans, and sugar-cane.

Southern Goiás is an area of particular importance in view of the active pioneer settlement which is taking place. A steady stream of settlers from the densely populated Atlantic states is moving into the hilly uplands. These immigrants are establishing small farms on land cleared of its forest cover. The Federal Government, anxious to open up the interior, is encouraging settlement, and to this end set up an agricultural colony 90 miles north of Anápolis, the present terminus of the railway, which pene-

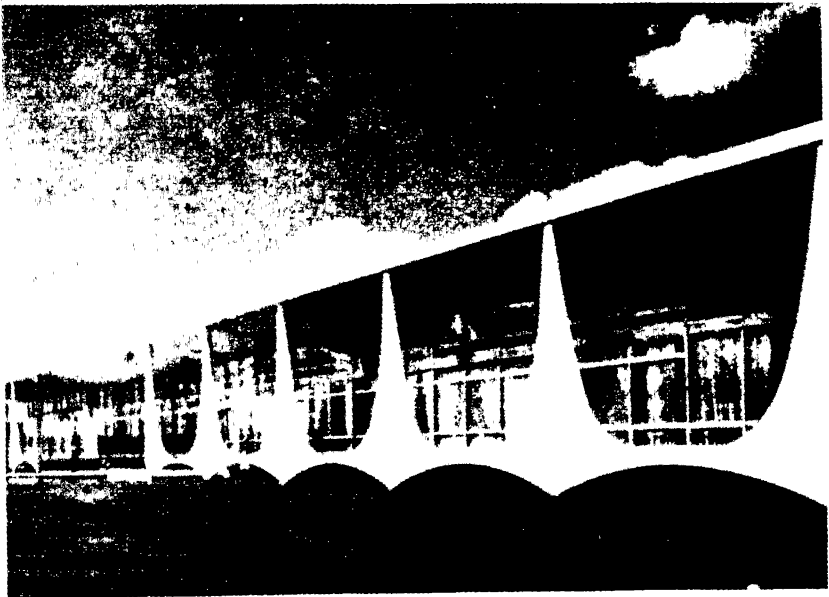
trates the plateau northwards from São Paulo. Several main roads link the chief settlements in the region.

Goiânia (60,000), the capital of Goiás State, is situated in the centre of the main agricultural and livestock area. It is a new city, not yet a quarter of a century old, and has been planned with a view to the future. It is believed that ultimately it will expand into a city of $\frac{1}{2}$ million people. Anápolis (50,000), near by, is a more important trading centre, since it is linked by railway to the populous south-east. North-west of Goiânia is Goiás, the old capital. Its origin was due to the discovery of gold in the vicinity by one of the early Portuguese adventurers, Bartholomeu Bueno. Goiás thus began as a mining centre in a high, barren valley. Its situation was not conducive to its further development, and when the gold ran out its decline set in. Today it musters a population of only about 6000. The highway, negotiable in the dry season only, which runs from Goiânia to Cuiabá, passes through Goiás city.

BRASÍLIA

Brasília became the new Federal Capital of Brazil on 21st April 1960. It has replaced Rio de Janeiro, which has been the capital for 125 years. Why this change? Why the need for a new capital, especially one that lies 3000 ft above sea-level, some 600 miles away from the coast, and is situated in the impoverished and undeveloped backland of Brazil?

The idea of an inland capital city has long been considered; it was



[Courtesy: Brazilian Government Trade Bureau.]

FIG. 107.—The new Presidential Palace ("of the Dawn") in Brasília, the new capital. Note the level nature of the plateau surface stretching to the far horizon.

advocated as early as 1882, and ten years later the Constitution set aside an area for a future interior capital. In 1946 a study of the new Federal District was made with a view to selecting a site. But the building of the new capital had to await the arrival of Brazil's dynamic President, Dr. Juscelino Kubitschek, who pledged himself to the construction of Brasília during his five-year term of office. The pledge has been fulfilled.

Brasília was built with a dual object in mind: first, to serve the administrative needs of a rapidly developing Brazil; second, to provide a nucleus and magnet for the opening up of the vast and virtually empty hinterland. There were other contributing factors: *Rio* is now overcrowded; *Rio* is cosmopolitan and does not represent the true life and spirit of present-day Brazil; Brasília is at the meeting-place of the major geographical regions of the republic; and Brasília is likely to curb and counteract the drift to the coastal cities and the growth of urban sprawl. It is hoped that the building of Brasília will lead to the opening up and development of the *sertão*, quicken national development, and help to decant some of the population from the coastal zone.

Several factors influenced the choice of the site. It was selected because of the temperate climatic conditions, the spacious level terrain which allowed for spacious building; the availability of building materials, stones, and limestone for cement; and the ready possibilities for hydro-electric-power development. The drawbacks to Brasília's location are mainly twofold: a situation in an area not particularly well suited to agriculture and a position away from lines of communication. But these drawbacks will quickly be eliminated, for the capital will require food, and the economic demand will make agriculture prosper, even if the soil is not of the best, and the capital will stimulate the building of communications, as, in fact, it already has done.

If Kubitschek was the driving force behind this splendid enterprise, Brasília as it is emerging is the creation principally of two men, the architects Lucio Costa, who planned and laid out the city, and Oscar Niemeyer, who designed many of its thrilling buildings. Brasília is taking shape as a modern air-age city, artistic and exciting, which has been widely acclaimed. Perhaps the achievement of Brasília has been most adequately summed up by André Malraux who said: "If Humanity should revive the passion for inscriptions on monuments, the writings for Brasília should be: Audacity, Energy and Confidence." Brasília, certainly, is a superb act of faith, symbolising the republic's hopes for the future. Its population in January 1960 had already reached a total of 64,000; by 1965 it has risen to 330,000.

THE LOWLANDS OF MATO GROSSO

Only a very small portion of the vast area of Mato Grosso State is occupied. The chief centres of population lie either along the crest of the main watershed, which runs roughly east-west, or along the railway, which runs from São Paulo to Corumbá on the Paraguay river.

In south-western Mato Grosso is an area of low-lying plains which

really forms a distinctive natural sub-region. Practically the whole area between the western edge of the great plateau and the River Paraguay is subject to seasonal flooding. When the rains swell the Paraguay and its tributaries the flood waters spill over the banks and spread over the level lowlands, converting them temporarily into marshes called *Pantanal*. After about six months the floods subside, leaving behind meadows of lush grass, which are obviously attractive to cattle-rearing. It should be emphasised that these plains, though covered by slow-running water during the flood season, do not form marshes in the usual sense of the term, for the water is not stagnant, the terrain dries out thoroughly, and malaria is absent. For this reason the term *Pantanal* is better rendered "floodland" rather than marshland.

The cattle-rearing industry, which is the most important in this region, has a long history. It first began to meet the needs of the early mining communities who worked the gold and diamond deposits. Originally the cattle industry was concentrated on the plateau, but later tended to move into the plains, where the pasturage was better. The cattle-breeding industry in the *Pantanal* is now being completely modernised. Breeding has been improved by introducing zebu bulls. Whereas formerly the cattle were moved from the *Pantanal* to the abattoirs in São Paulo some 650 miles away, increasingly they are being killed on the spot as more and more meat-processing firms are establishing themselves in the region. This means that the cattle will be spared the long overland trek which weakened them and made their flesh tough.

Apart from cattle-raising, economic activity is slight. Agricultural colonies are scattered here and there in valleys or on hill slopes where more fertile soils occur, but farming is subsistence in type. There is some collection of ipecac; the ipecacuanha plant grows in the vicinity of Cuiabá and Diamantino. Mangabeira, a rubber-producing plant, grows widely on the uplands of Mato Grosso, and there is some exploitation of it. In the damper areas of the extreme south-west there is much quebracho wood, which yields a valuable tannin extract. Iron-ore and manganese deposits are exploited in the vicinity of Morro do Urucum; the Urucum manganese ores are among the largest deposits in the world.

Cuiabá (64,000), on the edge of the plateau, and Corumbá (20,000) are the two chief towns. Cuiabá, with its central situation, is capital of Mato Grosso State. It lies in the centre of a pastoral district and of a diamond-producing area and is an important collecting point for ipecac. Corumbá, a river port on the Paraguay, is the chief commercial centre in Mato Grosso. Its exports include jerked beef, hides, skins, and ipecac. Corumbá is linked to São Paulo by railway, and has regular air-service connections with São Paulo and Cuiabá.

THE FUTURE OUTLOOK

Although the Interior Plateau is a region of considerable possibilities, chiefly as regards mining and stock-raising, its development will be slow

and, for a long time, very limited. Isolation, the product of inaccessibility, is the major deterrent to progress. The exploitation of the mineral resources—not yet fully investigated—is sorely handicapped by lack of communications and inadequate transport facilities. The cattle-grazing industry labours under two disadvantages, the pastoral conditions and the remoteness of the grazing lands. If some means could be found of overcoming the drawback of winter drought and of improving the quality of the animals so that they provided flesh equal to that of Argentinian beasts, then a flourishing industry might be established given adequate transport facilities.

Improved communications are a pre-requisite for future development. The problem of establishing agriculturally self-supporting colonies presents many problems, not least of which, however, in the past, has been the frustration of isolation. Air transport can do, and is doing, much to mitigate the feeling of remoteness, but road and rail links are also required. The opening up of the northern part of the plateau will lag behind that of the south, for its potential mineral wealth is largely unknown and its miscellaneous vegetable products are of only slight importance today. It will need a product or products of exceptional significance to tempt man into the wilderness of the northern *campos*. One should bear in mind that there still remain large areas in other parts of Brazil offering better conditions of climate, soil, and economic opportunity, and until these areas are fully settled the prospects for the peopling and development of the Central West are not very promising.

AMAZONIA

The region commonly known as Amazonia consists of the greater part of the drainage basin of the River Amazon and its tributaries; and, from the administrative point of view, comprises the great state of Amazonas, most of Pará, and the Federal Territories of *Río Branco* in the extreme north bordering British Guiana and Venezuela and Acre in the far west bordering Peru and Bolivia. To the Brazilians it is known simply as “the North.” In area, Amazonia constitutes some 40% of the national territory, yet its inhabitants number a mere 3% of Brazil’s total population. The 2 million or so people—exact numbers are impossible to procure—give an overall density of about one person per square mile, thus making Amazonia one of the most sparsely populated areas in the world. The thin spread of people has led to the area being called, not inaptly, “one of the world’s great deserts.” There are, indeed, few parts of the earth’s surface, other than the true hot or cold deserts, with such a low population density.

Much of Amazonia is still imperfectly known. Lying a thousand miles away from the core region of Brazil, “the North” lies beyond the ken of the average citizen: it is a remote, unknown land. It is, as it were, the counterpart of Canada’s Northern Territories or the Soviet Union’s Siberia of a couple of generations ago. The question which many Brazi-

lians ask is: can Amazonia be opened up and settled and its rich potential resources utilised (as has happened, at least to some considerable degree, in Siberia), or will it remain "the land of tomorrow—where tomorrow never comes"? Opinions about Amazonia's possibilities vary widely: from A. R. Wallace* writing in 1853 to John Gunther† writing a century later, the region's potentialities for settlement and production have been enthusiastically, even extravagantly, proclaimed; others have been much less sanguine. Here we shall attempt to evaluate the true situation.

PHYSICAL CHARACTER

Geographically, one of the most outstanding features of Amazonia is the uniformity of the physical conditions. Generally speaking, the region is one of slight surface relief with a constantly hot and humid climate and a thick tropical rain forest covering most of its area.

The common description of Amazonia as a vast plain is, however, slightly misleading. While it is true that the entire region has an elevation under 1000 ft and fully half lies below 500 ft, it is by no means perfectly level. On the other hand, the topographic variations are essentially gentle in their nature. Geologically, the Amazon lowlands form a vast structural basin which is slowly subsiding. The crystalline basement rocks have been buried by great thicknesses of sedimentary strata, mainly sandstones, horizontally bedded, which are themselves overlain by unconsolidated gravels, sands, clays, and alluvium.

As a result of the geology and river erosion three differing kinds of surface relief may be distinguished: (1) the swampy alluvial lowlands bordering the rivers, which vary between about 20 and 60 miles in width, are inundated in time of flood, and enclosed between valley bluffs; the flood plains comprise about 10% of the total area; (2) the low plains which rise above the highest flood level, but seldom reach more than 500 ft; these plains lying near to, and dissected by, the rivers form tabular uplands, which are especially well marked in the lower reaches of the river; (3) the high plains, usually between 500 and 1000 ft, which lie farther away from the main stream of the Amazon and characterise the interfluvial areas of the tributaries; these uplands have been fairly well cut up by river action and are better drained.

The most impressive feature of Amazonia on any map is, however, the river itself. The mighty Amazon with its numerous tributaries, themselves major rivers, forms the greatest river system in the world. About 170 miles wide at its mouth, the Amazon at Tabatinga, some 2000 miles from the Atlantic, is still almost 2 miles in width. Ocean-going ships can ascend the river to Manaus 1000 miles upstream, while vessels of under 14-ft draught can proceed a further 1300 miles to Iquitos in Peru. Most of the tributaries are navigable for considerable distances, but ultimately, where they cross the crystalline basement rocks, they are broken by falls

* *Travels on the Amazon and the Rio Negro*. London. 1853.

† *Inside South America*. New York: Harper and Row, 1967.

and rapids. During the flood season it is estimated that there are some 37,000 miles of navigable waterway. This magnificent system of natural waterways has alone made possible such exploitation as has been possible; without it inward penetration of this vast continental interior region would have been prohibited.

The climate is hot and humid throughout the year. Though temperatures are occasionally high, reaching over 90° F (32° C), they are generally around 80° F (27° C); it is completely erroneous to imagine the region to be unbearably hot. The most disagreeable feature of the temperature conditions is the absence of variation. But is it not the monotonous heat so much as the high humidity which is trying. The clamminess of the atmosphere makes for much discomfort, especially to Europeans used to the variability of temperate cyclonic climates. Breezes do much to dissipate discomfort, and where they are regularly experienced conditions are quite tolerable, maybe not unpleasant; but in areas where the air is still the feeling is one of uncomfortable sweltering heat. Daily rains, in torrential thundery showers, fall about noon and then clear quite quickly. At night the skies are clear and starry and often lit up by the brilliant flashes of electric storms.

THE SELVA

Subject to constant convectional rains and tropical temperatures, the region offers optimum conditions for plant growth, with the result that here flourishes the most extensive tropical rain-forest in the world. But here again there is a common misconception about the nature of the forest, both with respect to its coverage and its character.

The idea that the whole basin is smothered in thick, impenetrable forest dies hard. This concept arose out of the reports of early travellers who explored along the riverways, where, in truth, the forest is densest (Fig. 108). Here, where there is light and air as well as warmth and moisture, a dense undergrowth flourishes beneath the trees so that the watercourses are flanked by almost solid walls of greenery. Beyond this screen, the forest interior is usually dark and silent and contains little but rotting vegetation: all growth, and for that matter virtually all life, *e.g.* animals, birds, insects, is concentrated high overhead, so that from above the forest presents an unbroken mass of foliage as the branches of one tree interlace with those of another. But away from the rivers and where patches of porous soil occur there are numerous interruptions in the forest cover. Extensive stretches of savanna are to be found, grassy enclaves occur in places where the forest is thin, and areas of swampland on the flood plains frequently carry only coarse grasses. Thus, in thinking of Amazonia we must visualise a vast tract of selva punctuated by small localised patches of grassland and threaded by innumerable watercourses.

The rain-forest is a two- or three-tiered forest, broad leaved and ever-green in character. If there is a ground growth it commonly forms a tangle of low trees, 40-60 ft high, bushes, and woody climbing plants.



FIG. 108.—The Amazonian sylvia. The photograph shows the dense, luxuriant growth in riverside localities. Note the dark forest interior, and the crude hut built on silts. The native Indians of Amazonia build dugout canoes, for the rivers provide almost the only avenues of communication within the basin.

The second tier of trees, often containing varieties of palms, reaches a height of approximately 90–120 ft. The third tier comprises the giants of the forest, which tower up to 130–150 ft. The selva contains an astonishing number of species—over 4000 trees have been identified—but the individual species are inextricably intermingled and widely scattered through the forest. The trees are usually hung with, and interlaced by lianas and tree-perchers, which include some of the most beautiful orchids and flowering plants in the world. Several hundred species of parasitic and epiphytic plants may live on a single large tree.

The usual description of the rain-forest emphasises the luxuriant, proliferating growth, the wealth of plant species, and the splashes of brilliant colour which blooms and birds provide; but perhaps the most emphatic impression made upon those seeing the forest for the first time is the incredible range of greens, for every tone, hue, and shade of green imaginable is present. The tropical rain-forest has been named, and well-named, “green hell.” Life, other than plant life, is virtually stifled by this luxurious blanket of rank and rotting vegetation. The horrible odour of decay is yet another striking quality of the selva.

The plant species exhibit a wonderful adaptation to this ever-hot, ever-wet, environment. In the struggle for light and air trees grow tall and the trunks are supported by tremendous buttresses. Leaves are often large and thin, with surface runnels and drip-points to get rid of excessive moisture. Tree perchers frequently suspend their roots through the air, securing food and water from the atmosphere, while parasitic types find elbow-room in the forest by using the forest trees as hosts.

The forest may be said to be *the* dominating feature of the region in so far as man must come to terms with the forest before he can do anything. The exuberant vitality of plant growth is such that, thus far, man has been curbed and confined by it. Yet the forest forms the chief resource of the region, and upon its control and exploitation will depend the degree to which it becomes a home for man and of use to him.

THE PEOPLE

Amazonia at present offers a poor home for man and, as we have already seen, the region is very sparsely peopled. Two distinct communities live in the region, the native Indians and the immigrant settlers. Though there has been a considerable amount of contact and merging between the two groups, in many areas they are mutually hostile.

Of the total estimated population of Amazonia of 2 millions, the aboriginal peoples number perhaps 30,000–50,000. They fall into four principal groups, the Arawaks, the Caribs, the Tupis, and the Tapuyus. The Tupis, who live in the east, are the most numerous; they have come into contact with the civilised peoples of the east coast. Many of the native Indians, however, live in widely scattered tribal groups in the depths of the forest. Some of these forest-dwellers are friendly, but others are distinctly hostile and shun any contact with other people. These aboriginal peoples live,

for the most part, completely outside government control. Attempts have been, and are being, made to civilise, protect, and help the native Indians, and to this end the Brazilian Government has instituted the Indian Protection Service (*Serviço de Proteção aos Índios*—SPI for short), whose ultimate object is to civilise and incorporate the Indians into the Brazilian community. The work of the SPI men is extremely hazardous, and many have sacrificed their lives in this humanitarian service.

Immigrant settlers entered Amazonia both from the west and the east very early on. Jesuit missionaries penetrated the region as early as the sixteenth century. These were followed by Portuguese adventurers in search of gold and slaves. By 1616 Pará had been founded, and a little later a settlement was established at Manaus. But this early "pioneering" was fitful and lacked roots. Not until the nineteenth century, with the growth of the importance of rubber, did immigrants begin to move into Amazonia in appreciable numbers. It was this influx of exploiting traders which led to the comparatively dense settlement of the banks of the main stream of the Amazon. The greater part of the settlers, who include those who have come into the region since the rubber era, live in the eastern section of the basin—below Manaus—and especially around the mouth of the Amazon. Belém, with a population of some 495,000, is the chief focus of concentration.

By and large, the immigrant population is now a mixed one in the racial sense. There has been considerable inter-breeding with the indigenous people. The Negro strain, so very conspicuous in North-eastern Brazil, is scarcely evident. The characteristic human type is the mestizo, or *caboclo*, in which Indian blood is dominant.

NATURAL RESOURCES

If it is extravagant to claim that Amazonia is one of the richest store-houses of natural resources in the world it is at least permissible to say it has an amazing abundance of vegetable resources, much land potentially capable of cultivation, considerable areas offering possibilities for cattle-raising, well-stocked river fisheries, and some mineral resources.

The prodigious forest wealth of Amazonia has not been touched. Here is the largest area of tropical forest in the world, providing valuable timbers and cabinet woods, such as mahogany, rosewood, and balsawood. Exploitation of this timber wealth has been negligible because of the difficulties of extracting widely dispersed species, of transportation, and of labour supply. Some timber, however, is felled, trimmed, and sized, and is stacked at riverside depots to be collected every six months by ships sailing up the Amazon. Here, too, are inexhaustible stores of pulpwood for the future.

In addition to the opportunities offered for the exploitation of tropical hardwoods, the selva provides possibilities for forest gathering, an industry which, at present, dominates the economy of Amazonia. The inhabitants are chiefly concerned with the collection of latex for rubber, chicle for

chewing gum, kapok for fibre, coca leaves for cocaine, cinchona bark for quinine, and, best known of all, Brazil nuts. Manaus, in the heart of the basin, is a great collecting centre for these extractive industries.

In the more accessible areas, and where soils and other conditions permit, the small-scale cultivation of such crops as cacao, sugar, and rice is carried on. Production of foodstuffs, drugs, spices, and vegetable raw materials could be enormously expanded, but the difficulties to be faced in tropical agriculture (as the following account of rubber will show) are just as enormous. Mostly, however, agriculture in Amazonia is of the subsistence type and migratory in its nature.

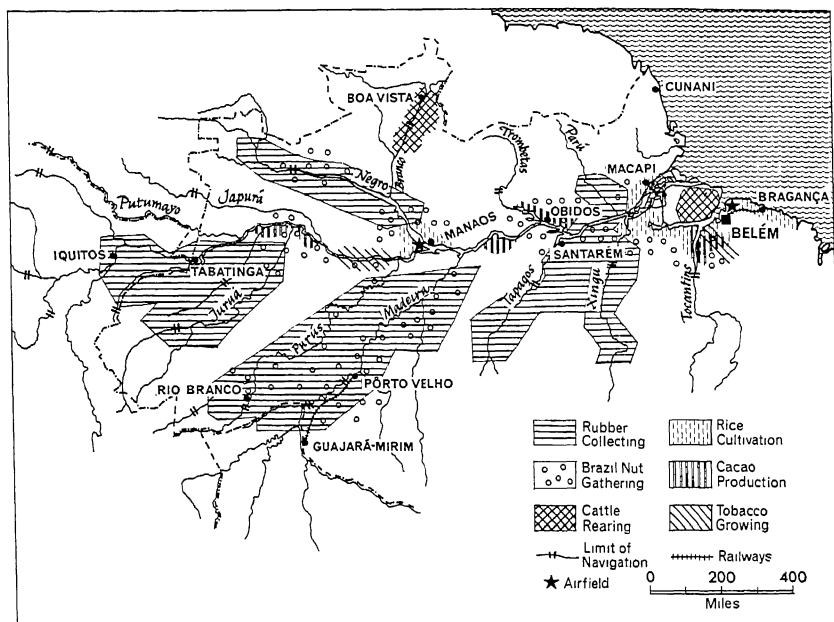


FIG. 109.—Amazonia: general features.

Cattle-raising is already practised in Amazonia, and there are about 1 million head of livestock. About 500,000 cattle are reared on the off-flooded pasture lands of Marajo Island in the estuary, about 200,000 on the extensive grazing lands around the headwaters of the Río Branco, and a few on the savannas north of Santarém. These grasslands could, feasibly, support greatly increased numbers of livestock under improved conditions of animal husbandry, including better livestock management and selectively bred strains of cattle.

Amazonia's mineral resources are incompletely known. The occurrence of minerals over large areas is unlikely, but the southern edge of the basin has rich beds of manganese ore. The crystalline and sandstone rock areas may prove to be rich in minerals. There is, too, definite evidence of oil deposits in the basin, but how much is, as yet, problematical.



[Courtesy: Brazilian Embassy.]

FIG. 110.—Ile de Mexiana, Pará. Note the coarse grass, the palms, and the bullocks used as mounts.

THE RUBBER BOOM

Until the beginning of the exploitation of natural rubber, a subsistence economy characterised the Amazonian region. Rubber was of no commercial significance until about the middle of the nineteenth century; then two developments—Charles Goodyear's discovery of the vulcanisation process, which eliminated the stickiness and brittleness of rubber, and the growth of the electrical industry, which wanted insulating material—led to a rapid growth in its demand. This demand was accelerated by the invention of the motor car and the use of rubber tyres.

Rubber is produced from the latex, or milky sap, of a tree, the species *Hevea brasiliensis*. (There are other rubber-yielding species, but none is comparable to the *Hevea*.) The latex is procured by making an incision through the bark to the latex-bearing cortex; from this cut the juice oozes out and is collected in a cup attached to the trunk.

Since the rubber trees, like all other species in the Amazonian forests, are widely dispersed, the collecting of wild rubber is not easy; the trees have to be located and then repeatedly visited to collect the latex. A sufficient supply of labour is, obviously, a pre-requisite of exploitation. The native Indians provided the only available labour, and the rubber traders persuaded them to become gatherers of rubber. Thus many of the aboriginal inhabitants forsook their traditional subsistence cultivation and came to depend upon collecting for their livelihood. This new way of life, in itself, brought distress to many Indians and their families, but when, later, the market for rubber collapsed distress was frequently followed by disaster.

As the demand for rubber soared, fortunes were made by the "rubber

barons." Manaus (Fig. 111), with its strategic situation, developed as a great collecting centre, and accordingly became one of the wealthiest cities in the world. Great docks were built to accommodate ocean-going vessels, a city tramway system was installed, fine and expensively furnished mansions were built, and a magnificent opera house "whose vast dome with its orange diamonds on a green background (the colours and design of the Brazilian flag) still dominates the city and is visible even over the forest as one approaches from downstream."*

In 1910 Amazonia produced 88% of the world's supply of rubber. In that same year the first plantation rubber from South-eastern Asia appeared on the world market. Brazil had had a monopoly of rubber until Sir Henry Wickham managed to smuggle some *Hevea* seeds to Kew, where they were planted in greenhouses and young rubber plants raised; these were subsequently sent out to Ceylon and then, later, to Malaya. By 1912 the rubber boom in the Amazon basin was over. The entire economy collapsed. From this body blow Amazonia never recovered; indeed, it may be claimed that the economic distress which followed in the wake of the collapse of the rubber business postponed the normal development of the region for half a century.

THE FORD EXPERIMENT

After the disastrous collapse of the rubber industry Amazonia languished for a couple of decades. Desultory and small-scale attempts were made to establish agricultural settlements after the First World War, and in Pará a Japanese company purchased $2\frac{1}{2}$ million acres of land and some 2000 Japanese were settled there and began to develop the territory, an undertaking of some significance and by far the most important experiment until the Ford Motor Company of the U.S.A. launched its great project.

In 1927 the Ford Company acquired a concession of $2\frac{1}{2}$ million acres in the State of Pará. The idea was to create a Western Hemisphere source of rubber, thus relieving the United States of its dependence upon Far Eastern supplies. At Fordlandia, situated on the right bank of the River Tapajóz just over 100 miles south of the Amazon, a scientifically planned project was established. A prefabricated settlement was set up and the work of clearing the land was begun in 1929. Over 8000 rubber trees had been planted before a number of unexpected difficulties arose. The estate was situated on a dissected plateau, and no sooner had the vegetative cover been cleared away than serious soil erosion began to occur, and it became imperative to adopt terracing, which was both arduous and costly, and to plant cover crops. Moreover, drainage constituted a serious problem, particularly in the valley bottoms, which were ill-drained. To make matters worse the rubber seedlings, some of which had been imported from Malaya, were slow in becoming acclimatised and finally were attacked by a blight. Faced with these problems, the Company, in 1934,

* JAMES, PRESTON E. *Latin America*. P. 548.

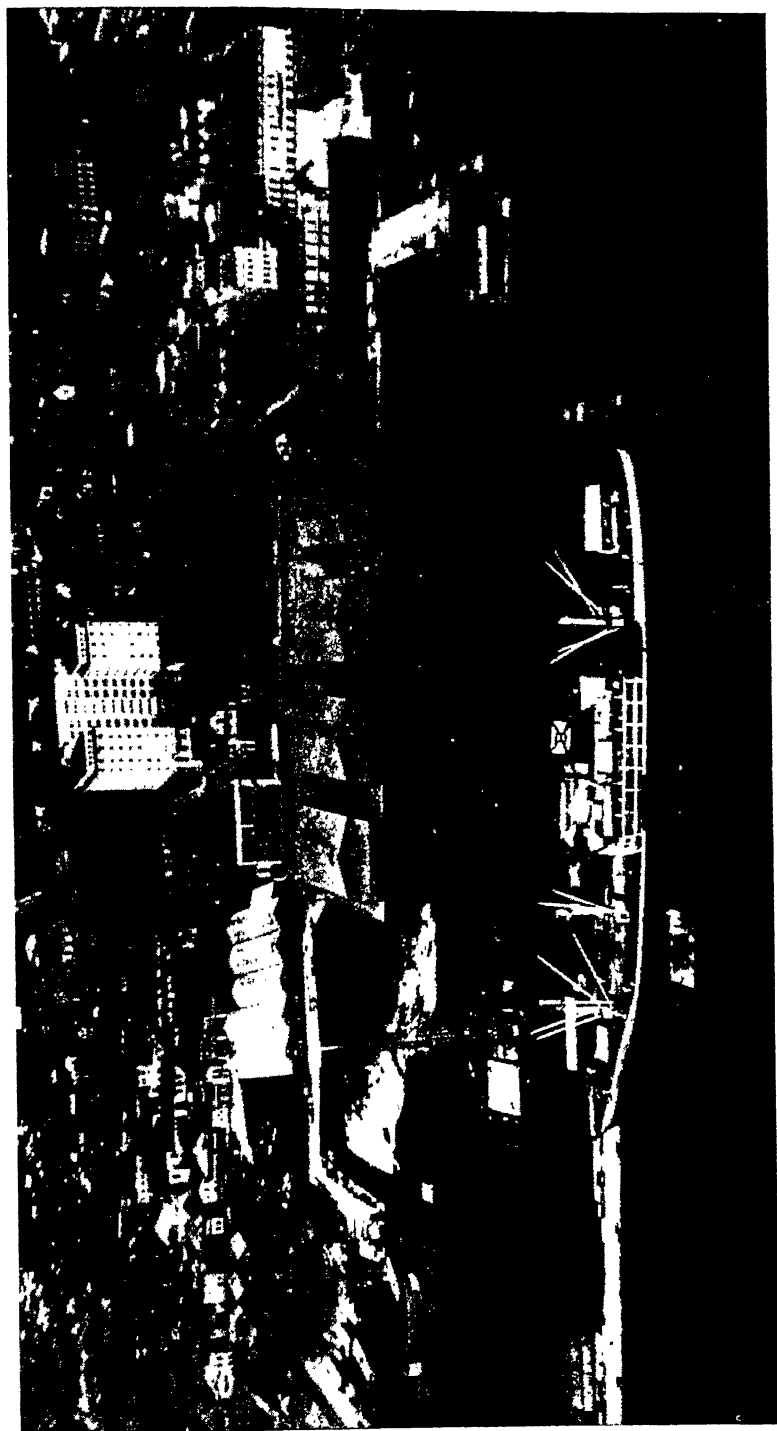


FIG. III.—View of Manaus. This is the waterfront at Manaus, which is an important river port. The size of the vessel, moored alongside a pier, is an indication that the Amazon at this point, 1000 miles upstream, is still a deep river.

sought and obtained a new concession of some 600,000 acres farther downstream.

The new estate, named Belterra, had several topographical advantages over Fordlandia: the terrain was much more gently sloping, and the friable soil made the use of machinery easier. Progress, however, even at Belterra was slower than anticipated, and the planned expansion of 5000 acres a year averaged less than half that figure. Ultimately, it was hoped to have 76,000 acres under production, but slightly less than one-third of this amount was ever planted. One of the biggest problems that confronted the Company was the securing of an adequate labour force. Workers were hard to come by, and the position was aggravated by the high wages which the Company offered: the native saw little point in working for a week when he could earn sufficient in a day to meet his wants. The Ford Company patriotically continued the project throughout the Second World War, but in 1946 the scheme was abandoned. It had cost several millions of pounds, but the entire concern was sold to the Brazilian Government for a mere £80,000.

Although the Ford project must be judged a failure, its story is worth recounting for the light it throws on the difficulties of agriculture under the tropical conditions obtaining in Amazonia. It was essentially a brave experiment from which many lessons were learned. Indeed, under Brazilian control and the direction of Dr. F. Camargo of the *Instituto Agrônomo do Norte* the old concessionary territories are now used as experimental stations for tropical farming and are beginning to show dividends. While the Institute continues to investigate the possibilities of successful farming, Unesco is undertaking a systematic scientific study of Amazonia.

THE ECONOMY TODAY

For some forty years after the collapse of the rubber export trade Amazonia was economically stagnant. Most of the people who had been concerned with rubber production had to adjust themselves to new economic conditions. In a broad way three main types of economic activity now prevail.

Some of the inhabitants, more particularly those living around the mouth of the Amazon, are cultivators. Cultivation is characteristically of the "slash and burn" shifting type. Land is cleared, manioc, maize, and melons planted, and then left, with little or no attention, until harvest-time. When the soil is exhausted after two or three croppings new land is cleared. At the mouth of the Amazon agriculture of a slightly more advanced kind is practised, and here a considerable variety of crops is produced, including sugar-cane, cacao, tobacco, rice, and manioc. Riverside communities, living in palm-thatched huts built on piles so as to be above the floods and the damp ground, subsist on a primitive agriculture supplemented by fishing, but if an alternative method of making a livelihood presents itself the natives will often forsake their agriculture.

Most of the inhabitants live by extractive industry, that is they are engaged in the collection of forest products. Some rubber is still collected, more especially in the upper Acre, Juruá, and Purús Rivers. Other products which are gathered include balata, a latex used in the manufacture of belting, Brazil nuts from the catanheiro tree, various hardwoods, oleaginous fruits and fibres, medicinal plants, hides and skins, while the large fish pirarucu is caught and salted and dried for export to other parts of Brazil.

Finally, there are those communities, few in numbers and widely scattered in the depths of the forest, who live completely self-sufficient lives. They subsist by collecting the fruits of the forest, nuts, roots, etc., by snaring small fry, by fishing, and by a little rudimentary cultivation. This is the economy of the aboriginal native peoples who live a primitive and isolated existence.

Since the end of the Second World War the first stirrings of new life have begun in Amazonia. The Brazilians, realising the great potential of these tropical lowlands and conscious of the vacuum that Amazonia provides in the body politic, have begun to plan the conquest of the region. 3% of the national revenue is now being applied to the development of Amazonia, and under the aegis of the so-called Central Brazil Foundation the opening up of the region is being carried out. Notable advances have already been made in many directions, *e.g.* SPI work, colonisation, agriculture, oil-prospecting, etc., but perhaps the most startling enterprise is what the Brazilians have called "the Great Diagonal," a series of airfields and settlements marking a new route across Amazonia which will link Río de Janeiro with Caracas in Venezuela. Gradually the pioneer fringe of settlement is moving northwards. It is said that 50,000 Brazilians a year are passing through Anápolis on their way to "the North." The programme of opening up, development, and organisation may be summed up in the words: "reclaim, educate, and populate."

A word of caution, however, is necessary. Whatever success the Brazilians may have in Amazonia, there will be difficulties and setbacks, and progress will be slow. 1,500,000 square miles of selva cannot be tamed in a decade, not even in a century, and such highly colourful statements as "the future home of a thousand million people" and "the chief hope of a plundered planet" show little appreciation of the geographical fundamentals of Amazonia.

THE BORO*

There are very few parts of the earth today harbouring peoples still in the lowest stage of cultural development, and since Amazonia is one of such places, it will be of interest to give some brief account of a group which is still in a rudimentary state and has only the most tenuous of contacts with modern civilisation.

* This account is based upon C. D. Forde's *Habitat, Economy and Society*. Methuen & Co., 1934. Pp. 131-48.

The Boro are one of the tribes of Indians inhabiting the western part of the Amazon basin. They live in the district to the north of Leticia (Tabatinga) in the middle reaches of the Japura, Putumayo, and Napo rivers. Their villages lie hidden, often away from the main river courses, in the all-pervading forest. Roughly circular clearings are made in the selva, and here large communal dwellings are built. These are constructed from forest materials, timber and thatch. The village clearings are connected to adjacent streams, used for communication and fishing, though the tracks to them are carefully concealed. Near the main clearing are other smaller clearings which are used for cultivation.

Clearing the forest is an extremely difficult task, for not merely is the vegetation thick but implements are crude. The trees are felled by stone axes which have to be obtained by barter from outside Boro territory, since the alluvial plain provides no local stone for the fashioning of implements. Stone cutting tools are a necessity, however, and must be procured. When the trees have been cut the undergrowth is cleared by firing. Next the ground is broken by means of wooden stakes, a procedure which may be likened to a primitive form of ploughing. This rough work is performed by the men. For the rest, cultivation is the task of the womenfolk. A simple digging stick is used to score holes in the ground, and in these seeds, tubers, and cuttings are planted. The principal crop is manioc; from the roots or tubers of the plant cassava is made.

The preparation of cassava flour is a skilful operation; the manioc tuber is cut up, soaked for a day or two to get rid of the poisonous element, then ground or grated into small pieces, squeezed in an ingenious squeezer, and finally dried and powdered by hand into flour. Cassava is the staple food-stuff in the diet. Other crops are also grown in smaller quantities, including sweet potatoes, yams, pumpkins, and peppers. Coca and tobacco, both important stimulants, are cultivated; the former is the only crop raised by the menfolk: it is their special task, for the narcotic is forbidden to the womenfolk. Although there is a little collecting and hunting—the men catch the small fry of the forest, but such wild game is relatively scarce—the Boro are basically dependent upon agriculture. The cleared patches quickly become exhausted and unproductive, and after two or three seasons new plots must be cleared. The Boro are thus primitive shifting agriculturalists.

A number of crafts have been developed, especially pottery and basketry, while hammocks for sleeping are fashioned from fibres collected in the forest. There is little need for clothing, hence garments, other than loincloths made from bark, are not made and true weaving has not been developed. The men make cunningly devised blowpipes for hunting purposes and use darts tipped with poison. The Boro, however, are not expert poison-makers, and they secure most of their supplies from other tribal groups. Dugout canoes are also made; these are long, slender craft hollowed out by burning and hewing suitable timbers, such as cedar trunks. They are propelled by paddles.

The Boro live as small autonomous, largely self-sufficing groups. Each community has a leader or chief; the clan leadership is commonly, though not always, passed on to the chief's son. Also, each community possesses a medicine man well versed in the arts of magic and a person of importance in the group by virtue of his special functions and powers. An interesting feature of Boro society is that although the male members remain throughout their lives with the community in which they were born, they must seek wives from other groups. This system makes for the continuity and unity of each Boro group.

Each Boro community has its own traditional territorial domain and, in spite of the shifting of the settlement every few years, the community never moves far from the old site. This applies to the Boro peoples as a whole and to neighbouring groups, such as the Okaina, Resigero, and Witoto. Fighting between different linguistic groups (and occasionally between communities of the same tongue) appears to be common. While adult prisoners are killed and frequently eaten, the young children who are captured are handed over to the chief and brought up as members of his own household.

The Boro form a fairly typical example of an Amazonian Indian community living deep in the forest. The small, isolated groups, having only intermittent contact with one another, possess a low level of culture, but, even so, they display a considerable degree of ingenuity and resourcefulness when one considers the adverse physical conditions of the environment in which they live.

SETTLEMENTS AND COMMUNICATIONS

The Amazon and its tributaries form the arteries of communication within the great lowland. Roads and railways, with one unique exception, are absent. Hence all the trade is waterborne. Virtually all the economic activity of the region is dependent upon the rivers. It has already been mentioned that the Amazon provides a wonderful system of inland waterways and that ocean-going vessels of up to 14-ft draught can ascend the river as far as Iquitos. The major tributaries are navigable for considerable distances, but the right-bank streams more especially are broken by falls and rapids so that their upper courses are unusable.

Apart from the railway which runs from Belem eastwards to Bragança, the only line in Amazonia is a 230-mile track along the River Madeira between Guajará-Mirim and Pôrto Velho in the south-western part of the basin. This railway was commenced in 1872 and was built to circumvent navigational difficulties on the river. Its purpose was to enable commodities from the Bolivian Oriente to be exported via the Amazon. Thousands of workers died in the initial attempt to lay the track, and before 5 miles of line had been completed the project was abandoned. It was given the epitaph, "Under each cross-tie a human skull." Not until forty years later was the line finished. It had to await the lessons learned in the construction of the Panamá Canal.

There are few towns in Amazonia and only two of any size. Belem (or Pará), which lies about 90 miles from the open ocean, is the entrepot port for the Amazon Basin. A handsome city, with a population of about 495,000, its commerce is principally in the products of its vast hinterland—rubber, timber, cacao, nuts, drugs, and cotton. Belem (which means Bethlehem) has two parts: the old town and the modern city. An interesting feature of Belem is the Bosque, a patch of jungle which has been left in its natural state and serves as a public park.

Manaos (or Manaus), situated nearly a thousand miles upstream and on the right bank of the Río Negro, is sited on a slight eminence to protect it from the river floods. The town, with its population of 175,000, though bearing an air of dilapidation, is paved, has electric lighting, a sewerage system, telephone service, and most of the amenities of a modern city. Manaos, right in the heart of the basin, comes as a surprise to the traveller: a big city in the midst of this sea of forest is just about the last thing he expects to come across. Manaos controls practically all the commerce of the interior of the lowland, and it is an important collecting centre for rubber, Brazil nuts, cacao, fibres, and a host of forest products of lesser importance. Regular steamer services run between Manaos and Liverpool (the Booth Line) and New York. Manaos has a few manufacturing industries, the most important of which are the processing of wild rubber and the making of tyres, brewing, and soap-making.

Obidos, a riverside town of about 20,000 people, is the centre of a cacao, tobacco, and sugar-growing district. Santarem, at the confluence of the Tapajóz with the Amazon, is a much smaller settlement; its population numbers only three or four thousand. Porto Velho in the far southwest is a new and growing town at the eastern terminus of the Madeira railway and at the northern terminus of the new highway which runs north-westwards from Cuiabá in Mata Grosso.

THE FUTURE

To conclude, let us try to evaluate the possibilities of Amazonia and to assess its future development.

First, the exploitation of Amazonia on any considerable scale is handicapped by several factors: (1) an enervating climate, which, though not intolerable, is more or less repellent to white people; (2) a vegetative cover so lush and dense that overland transport is seriously hampered and ground clearance is extremely difficult; (3) poor soils, except for alluvia, which are leached and which under cultivation quickly become exhausted; (4) the prevalence of rusts, blights, diseases, and pests which attack plants and make cultivation difficult; (5) the frequently hostile and intractable Indians and the scanty population, which means there is an inadequate labour supply; and (6) the sheer size and enormous distances which militate against settlement and create difficulties of contact.

In spite of these shortcomings, Amazonia has great potentialities. Apart from its forest resources, which are immense, the hot, humid con-

ditions are ideal for plant growth, and the region, properly developed, could produce enormous quantities of rice, cacao, and other tropical food-stuffs, spices and drugs, rubber, fibres, and vegetable oils. But time, capital, organisation, labour, and agricultural research will be required if the rich potentialities are to be realised.

So far, man has only nibbled at the edges so to speak, and the contribution which Amazonia has made to the Brazilian economy has been pitifully small. The physical and human factors referred to above help to explain this, but certain external conditions have contributed also to the region's slow commercial development: in the first place, the more accessible areas have been able to satisfy the external demand for commodities and, in the second place, the pressure of population in Brazil has not yet reached the point where man must perforce begin earnestly to colonise the region. While the tempo of development is likely to accelerate in the near future, it seems equally likely that such development will be along traditional lines, *i.e.* more extensive and intensive exploitation of forest resources, rather than in plantation agriculture and livestock industry, though these, too, will doubtless undergo some expansion.

Chapter X

TEMPERATE SOUTH AMERICA

ARGENTINA

THE Argentine Republic is, after Brazil, the most powerful and most important of the Latin American republics. It is essentially a modern phenomenon. During the Colonial Era it was a backwater and, apart from the port of Buenos Aires, which was established as an Atlantic outlet on the Río de la Plata estuary, the territory had little significance. Only a century ago Argentina was an undeveloped, underpopulated country, one of the world's open spaces.

In Spanish colonial times Argentina was part of the Vice-Royalty of Peru. Economic development and settlement were hindered by the fact that the country was lacking in precious metals and that all trade had to go via the transandine route. The establishment of Buenos Aires, although providing a nucleus for later growth, did little to effect development during the Colonial Era, because its trade was strictly regulated. In 1810, however, the Spanish yoke was thrown off, and in 1816 independence was proclaimed. The port of Buenos Aires was opened to foreign shipping, and from this time a new era in Argentinian history was inaugurated. Real development, however, did not take place until 1853, when stable government was established. Since that date the progress of the Republic has been rapid.

From the middle of the nineteenth century right up to 1931 British influence in Argentina was paramount. The influx of British immigrants and British capital took place on a very considerable scale, and the opening up and development of Argentina resulted very largely from this contribution. Britain also assisted Argentina by purchasing the bulk of her farm produce. There is thus some justification for saying that until recent times Argentina was virtually an economic dependency of Britain. Though the position has been substantially, one might even say drastically, changed during the past two decades, British financial interests in the country are still strong, and Britain is still one of the chief buyers of Argentinian produce. But since the Second World War very significant and far-reaching changes in both the political and economic spheres of Argentinian life have occurred.

GEOGRAPHICAL BACKGROUND

Argentina, with an area of 1,112,743 square miles, is, after Brazil, considerably the largest of the South American republics. It is a wedge-shaped country occupying the greater portion of the southern part of the continent east of the Andes.

Within Argentina four major physical divisions can be recognised. On the west the Andean cordillera, with its high ridges, plateaus, and basins in the north and its deeply cut glacial valleys and snowfields in the south, extends from the northern boundary to the extreme south of the mainland. To the east of the Andes lie extensive plains. South of approximately 40 degrees S., the plain or, more properly, in Patagonia, the low plateau is separated from the mountains by a clearly marked, though discontinuous, depression known as the pre-cordilleran trough. In a series of basins, which make up this depression, lie numerous ice-cut, moraine-dammed lakes.

The great plains lying to the east of the Andes may be divided into three sections. In the north are the Chaco Plains mostly under 500-ft elevation, except in the extreme north-west, where they abut on to the sub-Andean foothill zone and in the extreme north-east, where a finger of Argentine territory thrusts itself between Paraguay and Brazil and extends on to the Paraná Plateau. The Chaco Plains are mainly composed of thick alluvial deposits washed down from the highlands by the rivers Pilcomayo, Bermejo, Salado, Paraná, and Uruguay and whose level surfaces are seasonally flooded by the overspill from these braided rivers of uncertain courses, resulting in widespread areas of marshy terrain. The south-eastern portion of the Chaco, *i.e.* the land east of the Paraná, is frequently called Argentine Mesopotamia—the land between the rivers, *i.e.* the Paraná and Uruguay rivers. This mesopotamian region is made up in part of flood-plains, which are liable to inundation and may be wet and marshy, and in part of well-drained interfluvies.

In the centre are the Pampas, another extensive area of, for the most part, level monotonous plains broken in the Province of Córdoba by the upstanding crystalline uplands of the San Luis and Córdoba Ranges (which rise up to 5000 ft) and in the south-eastern part of the Province of Buenos Aires by the Tandil Hills (rising up to about 1000 ft) and the Sierra Ventana (rising to about 3000 ft). These hill masses represent protuberances of the crystalline foundation rocks above the later sedimentary rocks. The flat or very gently rolling Pampean Plains have been built up of older sedimentary, and more recent alluvial and acolian, deposits which, in places, are up to almost 1000 ft in thickness. The windborne deposit is a loess-like material, fine, porous, and stone-free which has weathered to give a phenomenally naturally rich soil. Surface conditions vary between area and area within the Pampas region, but, on the whole, in Buenos Aires Province, there is little surface drainage, although many parts are pitted by shallow lakes whose water appears and disappears with oscillations in the water table. In the slight surface depressions, known as *esteros* or *canadas*, water accumulates after rain storms and may remain as shallow sheets of water until it eventually evaporates or percolates away. The Río Salado del Sud,* which flows

* Not to be confused with the Río Salado mentioned above whose full name is the Salado del Norte (Northern Salado).

into Samborombon Bay, is a sequence of sluggish marsh streams rather than a true river and is frequently referred to as the Salado slough. A topographic feature of note is the *barranca* or steep bank, about 100 ft high, which borders the mudflats of the Plate estuary. In the north the Pampas are drained by the Paraná–Uruguay rivers and their lower course tributaries, which debouch into the Plate estuary through a vast delta.

Finally, in the south (approximately south of 39 degrees S. or south of the Río Colorado) is Patagonia, a triangular-shaped plateau averaging around 2000 ft in height, but by no means of uniform elevation, built up of granite rocks with overlying sandstones and basalt outpourings in places. Patagonia is traversed from west to east by a series of roughly parallel rivers which have incised themselves deeply to produce "high-cliffed corridors with a poor development of lateral stream valleys."*

In view of its great length from north to south, some 2300 miles, and its differences in relief, Argentina embraces a variety of natural regions. Four main ones may be distinguished: in the north is the Gran Chaco, a semi-tropical, forested, and, in parts, marshy lowland, underdeveloped and under-populated, containing scattered groups of primitive Indians; in the west is the Andean and Sub-Andean region, with its mountains, high valleys, and plateaus, semi-arid and dependent largely upon irrigation; to the south is the Patagonian plateau, a poor, cold, windswept land, thinly peopled and depending very largely upon pastoralism; and in the centre is the pampa, a vast, flat plain with a rich, deep, stoneless soil and well developed as an agricultural and pastoral region.

Argentina has considerable topographic and climatic diversity, and these differences are reflected in the unequal settlement, development, and land utilisation of the country. The Pampas region is the core of Argentina: the variegated outlying regions are all subsidiary to it.† Nothing illustrates this fact so well as a map showing the railway network of the country: an intricate web of railroads covers the pampas and focuses on Buenos Aires, but beyond the pampas the net becomes very attenuated. Here, within a distance of some 350–400 miles of the capital, where topography, soil, and climate are most conducive to settlement and economic activity, live most of Argentina's people.

Although Argentina possesses some of the finest agricultural land to be found anywhere in the world and has large areas of grassland suited to ranching, her natural resources are otherwise somewhat limited. The varied rocks of the sub-Andean zone contain gold, silver, tin, copper, tungsten, and coal, but not in any appreciable quantity so far as is known, and mining is of little significance in Argentina. Petroleum is the chief mineral product, and Argentina may possess oil deposits in fairly considerable quantities. So far oil is exploited in three main areas: in the Chubut district of Patagonia, around Mendoza in the Andean piedmont zone,

* BUTLAND, G. J. *Latin America*. Longmans, 1966. P. 283.

† PLATT, R. S. *Latin America*. P. 336.

and on the flanks of the Andes in the extreme north. The country's hydro-electric power potential is slight.

PEOPLE AND POPULATION

Argentina is distinguished from most of the other Latin American countries by its stock, its culture, and its outlook. The people of Argentina are preponderantly of European origin, and the bulk are first- or second-generation settlers. Practically every European nation has contributed its quota to the ethnic make-up of Argentina, but the major components are Italians, Spaniards, Germans, and Slavs. There is a good sprinkling of British stock, and to this day the people of Patagonia are strongly British. Jews are also found in considerable numbers.

These recent incomers hailing mainly from Europe were grafted on to the original Colonial Spanish stock, but they still form a comparatively undigested mixture. Assimilation is by no means complete; only prolonged time will weld them all into a homogeneous national body. One distinguishing feature of Argentina is her lack of strong Indian and Negro elements, which are characteristic of many of the other South American countries. The original native Indian population was small, and a high proportion was killed or died as a result of the Spanish occupation, thus the admixture of Indian blood is slight. Negroes were never imported into Argentina as they were into Brazil.

Immigration and population growth in Argentina have been relatively recent phenomena. The population, which in 1914 numbered some 8 millions, is now two and a half times as great. The total population in 1966 was estimated at 22,691,000. Over two-thirds of the population is urban, and nearly a fifth of the country's inhabitants dwell in the capital, Buenos Aires, which with its population of about 4 millions is the largest city not only in South America but in the entire southern hemisphere.

The population distribution pattern has many features of interest. The capital and its suburbs muster over 6 millions, while the surrounding province has almost as many people. This is an anomaly in a preponderantly agricultural country. Argentina, as a whole, however, is very much an urbanised country, and it has been estimated that 74% of the people live in urban centres of over 1000 population.

Three-quarters of Argentina's population lives in the pampa region. The major cities are the ports, and there are no large towns in the heart of the pampa, although there are numerous small centres acting as collecting and distributing foci. Without exception they lie on the railway lines which radiate from Buenos Aires (*see* Fig. 115).

The thinning out of the population with increasing distance from Buenos Aires is a result partly of climatic conditions; interiorwards it becomes increasingly arid and the land can be devoted only to extensive livestock rearing, except where irrigation is possible. But the sparseness of population is also due to the system of land-ownership; about two-thirds of the land is in large holdings, and this makes for a light rural population.

Another noteworthy feature is the shift in the centre of gravity of the population. Historically the centre of population was in the interior, and this was the case until less than a hundred years ago. Since about 1875, but especially during the past forty years, there has been a movement to the coast, particularly to Buenos Aires Province in which is now concentrated more than two-thirds of Argentina's total population.

History has given Argentina a veneer of Hispanic culture: the people speak Spanish and accept the literature of Spain as part of their inheritance; some 93% of the people are Roman Catholics; and many of the habits, manners, customs, and ideas betray Iberian origins.

ECONOMIC DEVELOPMENT

Meat and grain have formed the basis of Argentinian power and prosperity. Argentina is the largest food producer in South America and is one of the largest food exporters in the world. No detailed figures of the occupational distribution of the working population are available, but it is likely that some 50% live by agriculture, directly or indirectly, while over 90% of Argentina's exports consist of farm products.

The first stage in Argentina's economic development consisted of extensive cattle-raising: cattle were ranched on extensive *estancias* or vast estates and looked after by *gauchos*, the Pampean equivalent of the North American cowboy. In the very early days the animals were reared for their hides and tallow, later for dried or canned meat and, then, after the introduction of refrigeration, for frozen and chilled meat. During the latter part of the nineteenth century the pampas nearer the coast, which were moister, were given over to cereal growing, and ranching was displaced towards the drier west. Argentina developed as a major wheat producer and grew in addition large quantities of maize and linseed. The most recent development in this evolving agrarian pattern has been the growth of a dairying industry in the better-watered grassland areas and of market gardening.

Both internal and external factors assisted Argentina's growth as a major food producer. The pampas was "unique in its combination of extensive unbroken fertility, mild moist middle-latitude climate, and coastal accessibility."* To these favourable internal factors was added the demand for wheat and meat in the industrialised nations of Europe with their fast-growing populations. It was on these bases that Argentina prospered. While the pampas region is still the most important part of Argentina from the arable and pastoral point of view, and will always continue to be so, there have been developments elsewhere. The oases of Tucumán, Mendoza, etc., in the Andean piedmont zone are important sugar-, fruit-, and wine-producing areas; in the Chaco region cotton, tobacco, and yerba maté are produced and offer prospects for greater production; while Patagonia is an important sheep-rearing region.

Animal farming and arable farming have been, and still are, basic and

* PLATT, *op. cit.*, p. 335.

are likely to remain so, but during the present century industrialism has been growing at an accelerated pace. Since the end of the Second World War, particularly under the Perón regime (1946-55), a policy of national self-sufficiency has been vigorously pursued. Industry has been favoured at the expense of agriculture; this has resulted in a setback in agricultural development and encouraged a drift away from the land. If industrialisation had proved to be an unqualified success the economic situation might not have been so serious; unfortunately, the programme of industrialisation fell short and, belatedly, in the autumn of 1949 the Government jettisoned part of its much-vaunted industrialisation plan and decided to concentrate upon agriculture. This, in conjunction with serious trading troubles, has put Argentina in an unhealthy economic situation. For several years the country has had to battle with low productivity, dwindling exports, severe inflation, and industrial unrest. The economy, in need of a thorough overhaul, is now being adjusted.

AGRICULTURE

As a result of Argentina's considerable range of climatic conditions, which vary from tropical to sub-arctic, she produces a correspondingly wide range of crops, among them being rice, sugar, tobacco, cotton, ground-nuts, oranges, grapes, pears, linseed, maize, wheat, barley, oats, and rye. Moreover, different kinds of pasture enable her to raise large numbers of cattle, sheep, goats, and pigs.

The total area of Argentina is 690 million acres. Of this figure about 310 million acres or 41% of the total acreage are pasture and about 58 million acres or 11% arable. Just over 17% of the area is classed as forest and woodland and about 30% as non-productive land. Thus over half of Argentina consists of agricultural and ranching land. Moreover, Argentina possesses some of the best agricultural land in the world. In view of the favourable geographical conditions, particularly topography, soil, climate, and coastal accessibility, it is not surprising that Argentina has developed as a great food-producing and food-exporting country. Though she has come to be identified more especially as a producer of meat on a large scale, she is equally important as a grower of crops. Cereals alone, for example, account for about one-third by value of Argentina's exports.

The area under crops has varied considerably during the past quarter of a century: in 1927 it was 60 million acres, in 1937 67.4 million acres, in 1951 59 million acres, and in 1963 64 million acres. In the post-war period not only was the arable area reduced but the acreage devoted to the various crops also showed notable changes: the area occupied by the export grains (wheat and maize) and linseed showed a conspicuous decrease, but such crops as barley, rye, sunflower, and other oil-seeds showed an increase. Even so, the total acreage of grain crops was about 30% less than in the immediate pre-war years. This decline is in no way connected with physical factors, rather does it reflect the post-war

emphasis on industrialisation and the general neglect of agriculture by the Government. The recent switch back to an emphasis on agricultural production will doubtless help to reverse the trend during the 'forties. At the present time about 60% of the total farm area, amounting to 425 million acres, is under pasture, 10% is in annual crops, and 5% is in permanent crops.

The Pampas region is both agriculturally and economically by far the most important part of Argentina. Here most of the grains—wheat, maize, barley, oats, and rye—are grown along with linseed, sunflower, and alfalfa. Virtually the entire acreage of all these crops occurs in this region. Areas devoted to cereals elsewhere in Argentina are small.

No systematic rotation of crops is practised on the Pampas. If yields of grain begin to decline it is usual to lay the land down to alfalfa for a short time. Alfalfa (lucerne), of which there are some 14 million acres, is not only indispensable as a cattle feedstuff but also replenishes the soil with nitrogen. The pampas soils, however, are naturally rich and have been cropped for a long time without showing any serious signs of exhaustion. Nevertheless, if their high fertility is to be maintained, fertiliser should be applied. So far, artificial manures have been little used. The only areas in Argentina where fertilisers are used to any considerable extent are those of specialised crop production, *e.g.* the sugar-cane and tobacco areas, and the market-gardening districts around the Plate estuary.

In the tropical and sub-tropical regions of the north and in the irrigated oases of the sub-Andean western margins cultivation is principally directed towards specialised crop production, such as rice, maté, sugar, vines, citrus fruits, and cotton. Some 676,000 acres are devoted to sugar-cane in the north-west around Tucumán, Jujuy, and Salta. A point worthy of note is that around Tucumán the cane is grown by small independent farmers called *caneros*, who sell the cane to the factories, while around Jujuy and Salta the sugar is grown on large plantations which depend upon migratory seasonal labour from Bolivia and the Chaco. Rice, about 112,000 acres of it, is grown in the Paraná, Corrientes, and Tucumán deltas. Cotton, grown on over 1 million acres in the Chaco region, yields 100,000 tons of ginned cotton. The cultivation of tobacco is of growing importance and in 1960 Argentina increased her tobacco output to 92 million lb, a rise of over 50% on the 1959 figure. Vines are cultivated in the foothill oases of Mendoza, San Rafael, San Luis, and San Juan. Orange production is mainly concentrated around Tucumán. From the tropical forests of the north quebracho is obtained; the extract from quebracho is used in the tanning industry. Yerba maté is extensively grown in the province of Misiones.

There are some 310 million acres in Argentina suitable for grazing, but about half is second-quality pasture. This vast area of grassland has given rise to commercial grazing on a big scale, and Argentina is one of the world's foremost stock-raising countries. Her animal population is approximately as follows:

| | <i>Millions</i> | | <i>Millions</i> |
|------------|-----------------|------------|-----------------|
| Cattle . . | 43 | Pigs . . | 4 |
| Sheep . . | 48 | Horses . . | 5 |
| Goats . . | 5 | | |

The eastern part of the pampas region, between La Plata and Bahía Blanca, is better watered than the western part; hence a distinction is drawn between the "humid" and the "dry" pampa.* The former, as we have seen, is well suited to crop growing, and although large quantities of grain are produced, it remains fundamentally a stock-rearing area. Commercial grazing has in the past provided such handsome profits and such an agreeable way of life to the estancieros that crop growing has only slowly made headway. An equable climate and all-year-round pasture make the humid pampa a first-class grazing region. The natural pasture has been largely replaced by alfalfa. The use of alfalfa meadows for cattle fattening has been instrumental in reserving the humid pampa for cattle; sheep, on the other hand, which were originally the more important, have been increasingly pushed out into the drier grasslands of the dry pampa. The original native cattle have been, and are continually being, improved by the importation of pure-bred stock—especially English Shorthorns and Herefords—of the finest kind. In this way the Argentinians maintain the good quality of their beasts. In spite of the decline in the importance of sheep, the humid pampa is still the main area for sheep: indeed, the province of Buenos Aires still has over 40% of the country's sheep population. The sheep, however, are concentrated in the drier parts of the grassland and are conspicuously few near the estuary, where the moist conditions have stimulated the development of a dairying industry.

In the drier grasslands of the west, where precipitation is around 10 in. or less annually and, therefore, too low for cultivation, stock-grazing is all important. The animals, both cattle and sheep, are of lower grade. The scarcity of forage gives rise to a seasonal movement of the animals; in spring and early summer the flocks of sheep migrate into the mountain valleys and up the slopes of the Andean foothills. In the drier parts of the arid west goats are reared. In the south, in Patagonia, where conditions are cooler and the pasture often poor, sheep become dominant and are reared more particularly for their wool. Some frozen mutton is also produced.

Ever since the introduction of refrigeration some three-quarters of a century ago, Argentina has been a major producer and exporter of meat, hides, skins, and wool. Since the Second World War Argentina's exports of meat have been substantially less than in pre-war years; this reflects increased home consumption, consequent upon the recent rapid increase in population and perhaps higher living standards for a proportion of the population, and also shows the effect of factors of a political nature.

* Today, however, the distinction between the "dry" pampa and the "humid" pampa is one related to the human development of the region rather than to inches of rainfall.

Argentina's wool output totalled 434 million lb during the 1959-60 season, nearly 10% of world production. Argentina specialises in the production of cross-breds and carpet wools.

INDUSTRIALISATION

It is customary to think of Argentina as an essentially arable and pastoral country, but industrialisation has been growing for half a century. About fifty years ago approximately 75% of the working population were engaged in agriculture, and apart from food-processing industries and one or two manufactures there was little industrial development. The difficulties of the First World War did much to stimulate industry, and by 1935 some 40% of the value of Argentina's total production was being accounted for by industrial output. The Second World War brought another dislocation in the economic life of Argentina. Unable to secure the manufactured goods she required, she was compelled to make them herself. But industrialisation was also assisted by the political situation.

In 1943 a military *coup d'état* brought Juan Perón into power. Perón had ambitions not only for himself but also for Argentina. Realising the economic weakness of his country, he introduced, in 1946, a Five-Year Plan by which Argentina was to be converted from a predominantly agricultural state primarily dependent upon the sale of its farm products into an industrialised and economically independent state. The main provisions of the Plan were: (1) the development of hydro-electric power to serve the demands of industry; (2) the increased exploitation of mineral and forest resources; (3) State help for vital industries; (4) the importation of skilled workers, technicians, and scientists; (5) improved conditions of work and remuneration for the workers. This £400 million Plan was to alter the whole basis of the Argentine economy. Unfortunately Perón did not realise the fundamental importance of fuel and power supplies for the implementation of his Plan and the necessity of maintaining a healthy agriculture. Perón's regime failed to make the investments required to produce the fuel and power which were needed for the industrialisation programme. Private enterprise might have made the necessary investments, but the Government failed to create the conditions which would have made this possible. As a result, the industrialisation programme has been only partially achieved and agriculture has suffered seriously.

Although Perón's Plan proved to be nearly disastrous from the point of view of Argentina's economy, one must not be tempted to underestimate the importance of manufacture in the country's economy. Between 1946 and 1955 a big change did take place in the country's economy. By 1951 60% of Argentina's productive wealth was industrial. In 1943 the number of industrial establishments was 65,803: ten years later this figure had doubled itself. The textile and container industries are of considerable importance. There are some 600 textile mills, and Argentina is practically self-sufficient in cotton, woollen, and knitted goods. She also produces

all the cement she needs. Such light industries as electrical equipment, aluminium ware, soap-making, paper-making, plastics, glass, footwear, furniture, and confectionery are all well advanced and expanding. Argentina's industrial weakness lies in her heavy industry, which is poorly developed, although she has tried to remedy this deficiency by setting up a steel plant at San Nicolas; it began production early in 1960. Heavy industry, however, is seriously handicapped by the lack of metallic ores and fuel resources.

The aim of industrialisation as an end in itself—the policy followed by the Perón regime—was at variance with the traditional agricultural pattern of Argentina. Many Argentinians began to appreciate the folly of too rapid and too much industrialisation, especially if it was at the expense of agriculture. Although at the present time Perón has gone and there has been some switch back to agriculture, the trend towards industrialisation has become firmly established. It is likely that industrialisation will be soft pedalled until Argentina has solved her fuel and power problem. And currently attention is being directed towards oil exploration and exploitation, the construction of natural-gas pipelines, the development of the Río Turbio coalfield, and the building of hydro-electric and thermal-electric plants.* The map, Fig. 112, shows the main power and communications developments, established and projected, of Argentina.

MINERAL WEALTH

Argentina is not particularly well endowed with mineral resources, although, as geological survey and exploration take place, it is becoming evident that the Republic has more mineral wealth than was formerly believed.

Argentina is deficient in power resources, a factor which has handicapped industrial expansion. Petroleum, which occurs in various parts of the Republic, notably at Comodoro Rivadavia (in the province of Chubut) Mendoza, Plaza Huincul (in the province of Neuquen), and at Tartagal (in the province of Salta), has been exploited with increasing vigour during recent years, and the output between 1958 and 1963 almost quadrupled: from 34 to 110 million barrels.

Argentina is lacking in coal. The only important deposit is the Río Turbio field in the upper valley of the Río Gallegos. This field has large deposits of coal, although the coal is of poor quality. Nevertheless, the deposits are of much value, since Argentina has been obliged to import considerable quantities of coal in the past. The coal from the Río Turbio field is railed to the town of Río Gallegos at the mouth of the river of that name. Some lignite deposits near Mendoza are also mined.

The chief hydro-electric power resources occur in Misiones in the extreme north-east of the country. Where the rivers flow from the Paraná Plateau, they have cut deep canyons; also where the lava sheets provide

* "Argentina Re-charts Its Energy Programme." *The Times Review of Industry*, March 1958.

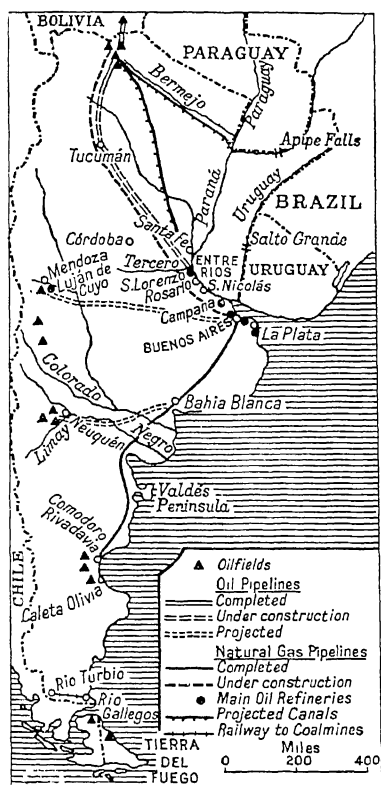
resistant rock layers great waterfalls have been created. This is the region of greatest hydro-electric potential, but, unfortunately, it is far removed from Argentina's industrial areas.

There is an iron-ore field at Zapla near Jujuy which feeds a local iron industry. High-grade deposits of iron ore have been found to the south of the Río Negro, and plans are being made to develop them. Lead, zinc, tungsten, sulphur, mica, and salt are the other main minerals exploited, although there are small worked deposits of a number of other minerals. The output of all these minerals is not large, but increasing attention is being directed to the development of these natural resources.

COMMUNICATIONS

Argentina is better served with communications than most Latin American countries. Interior communications are by road, railway, air, and river. Except in Patagonia, most of the country is served by roads, but very few are good by British standards. It has been said that Argentina needs 30,000 miles of good roads but has never had them. In spite of the flatness of the pampas, road construction has always proved difficult; the stoneless soil provides no road metal. Even today, roads in the rural areas become quagmires of mud during the rainy season; they are negotiable for motor vehicles only in the dry season. Until 1940 the trans-Andean road climbed up to and over the Uspallata Pass by means of numerous hairpin bends, but in that year a road tunnel through the mountains greatly eased the link between Argentina and Chile.

Argentina is well supplied with railways, especially in the humid pampa region, which has a very close network of lines. On the grasslands railway construction is easy and building and maintenance costs are low, since on the nearly level surface cuttings, embankments, bridges, tunnels, etc., are not required. Most of the railways were built by British companies, but not, unfortunately, with a uniform gauge; hence the railway system suffers from a mixture of three gauges—broad, standard, and narrow. Of the total 26,782 miles



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FIG. 112.—Argentina: general features.

of track, 18,747 miles or some 70%, occurs on the pampas. Buenos Aires is the great hub of the system, with all the four main arterial lines—the Ferrocarril del Sud, the Ferrocarril Oeste, the Ferrocarril de Buenos Aires al Pacifico, and the Ferrocarril Central Argentino—radiating from it. Rosario, Córdoba, and Bahía Blanca form secondary foci. Through communication exists with Chile, via Mendoza, with Bolivia, via Tucumán and Jujuy, and with Uruguay and Brazil across the Río Uruguay. Since the railways were taken over by the Argentine Government in 1948 they have suffered neglect, and now practically the whole system is in need of overhaul and renewal.

Aviation is as important in Argentina as elsewhere in Latin America, and there are both national and privately-owned airlines. Ranch-owners make much use of light aircraft, and in advertisements of cattle sales the notice "airstrip available" often occurs, plainly indicating the significance of air communications. Many parts of Patagonia are readily accessible only by air or sea. The rivers Paraná and Uruguay are navigable in their lower courses, though they do not provide very satisfactory water routes. On the Paraná ocean-going vessels can proceed only as far as Rosario and Santa Fé; on the Uruguay passage beyond Concordia is blocked by rapids. Small vessels ply on the Ríos Colorado and Negro in northern Patagonia. Argentina's main sea outlets are Buenos Aires, the near by modern port of La Plata, Bahía Blanca, and Rosario.

ARGENTINA: REGIONS (Fig. 113)

The well-marked differences in geological structure, topography, climate, vegetation, and soils, enable a number of natural regions to be distinguished. Differences in historical development, accessibility, human occupation, and economic utilisation emphasise further these natural regional differences. Hence it is possible to recognise four or five quite distinct geographical regions. The following grouping is more or less generally accepted and forms a convenient division for regional treatment.

THE PAMPAS

The pampas or natural grasslands stretch for some 350–400 miles north, west, and south of Buenos Aires, forming a wide, level, monotonous plain in the centre and west and undulating slightly in the north and south. Virtually the whole region, which covers an area of $\frac{1}{4}$ million square miles—about one-fifth of the country—

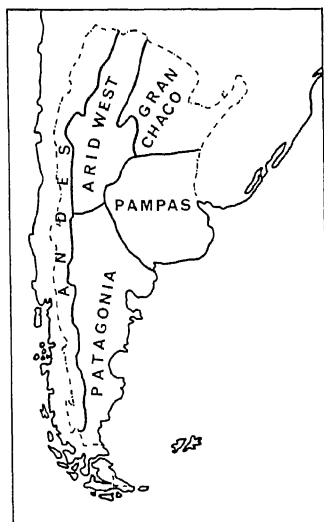


FIG. 113.—Argentina: regions.

lies under 500 ft. The soil, which is a deep, stoneless loam, is extremely fertile and easily worked, and in spite of many decades of crop-growing, shows little sign of exhaustion. Climatically the pampas have hot summers and warm winters; frosts and snow are rare; rainfall is fairly plentiful, falling in spring and summer, with a maximum in the latter season, but the amount decreases towards the south and west. In their natural state the pampas were covered with grass and, in the drier parts, scrub, a vegetation known as *monte*. In the wetter areas nearer the La Plata estuary prairie grasses 4 ft high and more, with silver, feathery plumes, were typical. This difference in vegetation suggests a division, and it has become usual to differentiate between the Dry Pampas and the Humid Pampas (*cf.* the tall grass and short grass Prairies of North America).

When the Spaniards first arrived in Argentina the grassy plains were the habitat of the guanaco and rhea, which were hunted by the indigenous Indian inhabitants. Not much more than a century ago the pampas were still virgin territory still roamed by Indians. From a wilderness of tussocky grassland man, with the aid of barbed wire, wind pumps, pedigree stock, agricultural machinery, and the railway, has transformed it into a rich and productive farm. Today the pampas is a humanised, developed region, linked by a network of communications and fringed with large towns. The pampas are essentially an agricultural and pastoral region and, since it is completely lacking in mineral and fuel resources, it is, as Professor L. D. Stamp has said, likely long to remain one of the earth's most exclusively agricultural areas.*

The pampas today are noted for their cattle, yet cattle were unknown until, as the story goes, the famous "seven cows and one bull" were introduced in 1552 by two Portuguese brothers named Goes. More cattle were introduced as time went on, as well as horses, sheep, and goats. The cattle multiplied prolifically, and within a couple of hundred years vast herds of wild cattle roamed the pampas. So numerous were they that anyone had the legal right to take up to 12,000 head of them! Man, in the beginning, made little attempt to herd them; instead he hunted. Cattle were killed wholesale for hides and tallow, these being the only valuable products; flesh, in those early days, was useless. However, by 1830 a new development had begun to take place. Large quantities of dried beef began to be exported to the West Indies to feed the workers on the plantations. The introduction of the tin can was the next important development. Finally, the process of freezing meat to preserve it was introduced in 1880. Refrigeration was a great boon, and led to greatly increased exports of meat. Meat in all its forms—frozen, chilled, dried or "jerked," tinned, and in concentrates and extracts—found a ready market in industrial Europe. As Europe became industrialised and her population expanded extra sources of food were required, and Argentine meat became increasingly valuable. The demand stimulated the cattle-rearing industry in turn.

* *The Americas*. P. 215.

During the present century a change has come over the pampas; arable farming now competes with pastoral farming, and is equally if not more important. Large-scale farming in the Humid Pampas is favoured by the natural conditions: the level surface allows mechanised agriculture to be practised; the dark grassland soils are very rich and fertiliser is virtually unknown; the long, hot summer and moderate rainfall at all seasons favour the growth of crops; and underground supplies of water are at hand.

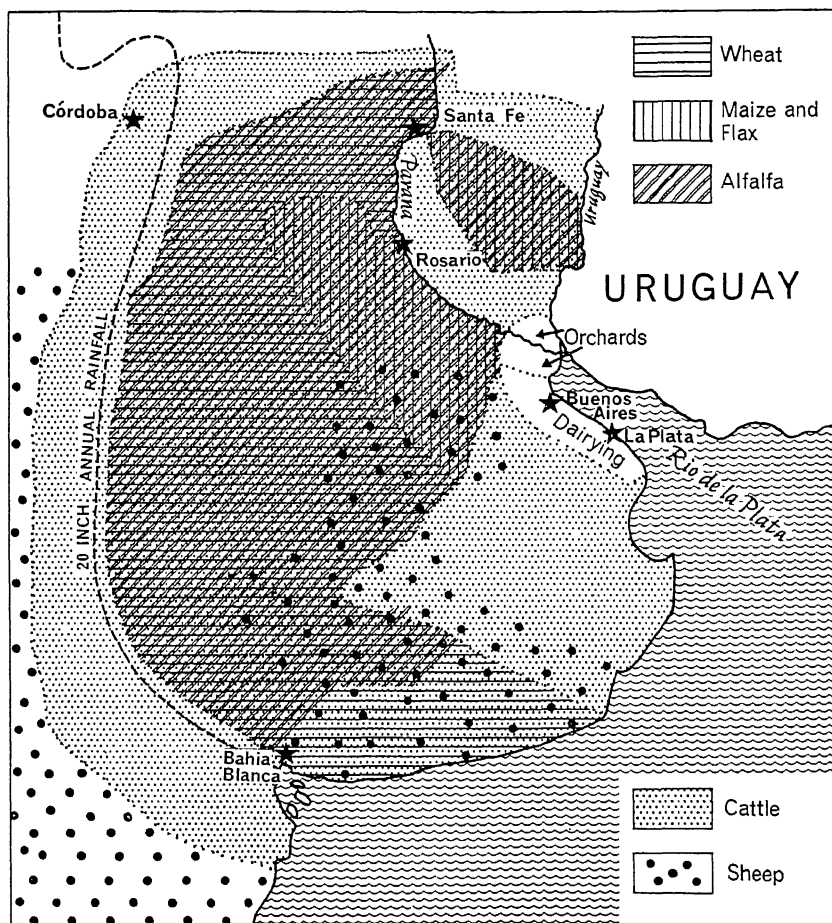


FIG. 114.—The Humid Pampas: crops and animals.

There is no uniformity of farming in the pampas, and types of farming in any particular area have changed. Speaking generally, however, four principal agricultural areas may be differentiated. Firstly, there is the intensive market-gardening, dairying, and orchard district immediately around the town of Buenos Aires; the demand of the estuarine towns for fresh milk, vegetables, and fruit has determined this development.

Secondly, there is the pastoral region, which lies in the south-east between Buenos Aires and Bahía Blanca, a district rearing high-grade livestock with little arable farming. Thirdly, there is the wheat crescent, which stretches from Rosario in the north to Bahía Blanca in the south, a belt which also has a big acreage devoted to alfalfa. Fourthly, around Rosario, where it is hotter and damper, is the maize and linseed area, the flax being grown chiefly in the province of Entre Ríos. While these crop districts can be differentiated, it must be remembered, as Professor P. James points out,* that nowhere in the Humid Pampas is there less than 40% of the area given over to pasture; also, that alfalfa, a deep-rooted plant belonging to the clover family and an invaluable forage crop, is very widely grown and is the "pivotal crop" in the pampas economy. Arable farming has tended to push pastoral farming into the Dry Pampas. Sheep-rearing still remains an important branch of farming on the pampas, though cattle are displacing sheep on the more fertile land.

The uniformity which characterised the pampas during the early days of its development has been replaced during recent decades by variety of agriculture, particularly in the northern half. On the whole, the pampas are a region of large estates, although there is a tendency for the big units to break up. Typically, the very large estates are devoted to livestock rearing, with cereal cultivation as a subsidiary interest. On the other hand, the small owners are normally interested in grain. Agricultural development in the pampas has served a dual purpose and, apart from the consumption crops and products of the littoral, it produces feeding-stuffs for livestock and grain, wheat and maize, for export.

The pampas form one of the well-populated regions of South America, and about two-thirds of Argentina's people live in this area. Economic progress has led to the development of a close railway network, and the pampas is one of the few parts of the continent that is well served with communications. The region, moreover, is the most urbanised part of Argentina. There is a number of towns, mainly on the periphery of the region, but five large urban centres dominate the area, viz. Buenos Aires, La Plata, Rosario, Santa Fé, and Bahía Blanca.

Buenos Aires (3,900,000) is the capital and largest city as well as the chief port. Growing up around a small creek, which provided sheltered anchorage for vessels during the Colonial Era, it now spreads widely over the dead level plain. It is the hub of the railway system. Well equipped with modern docks, it conducts the major portion of Argentina's foreign trade. Numerous shipping lines connect it with other important world ports. Industrially, Buenos Aires is the first city not merely of Argentina but of South America; among its industries and manufactures are meat packing, flour milling, food processing, textiles, engineering, and leather goods. Built upon a rectangular grid with many plazas and parks, Buenos Aires is a fine, handsome city.

Gran (Greater) Buenos Aires consists of the Federal Capital together

* *Latin America*. Pp. 341-51.

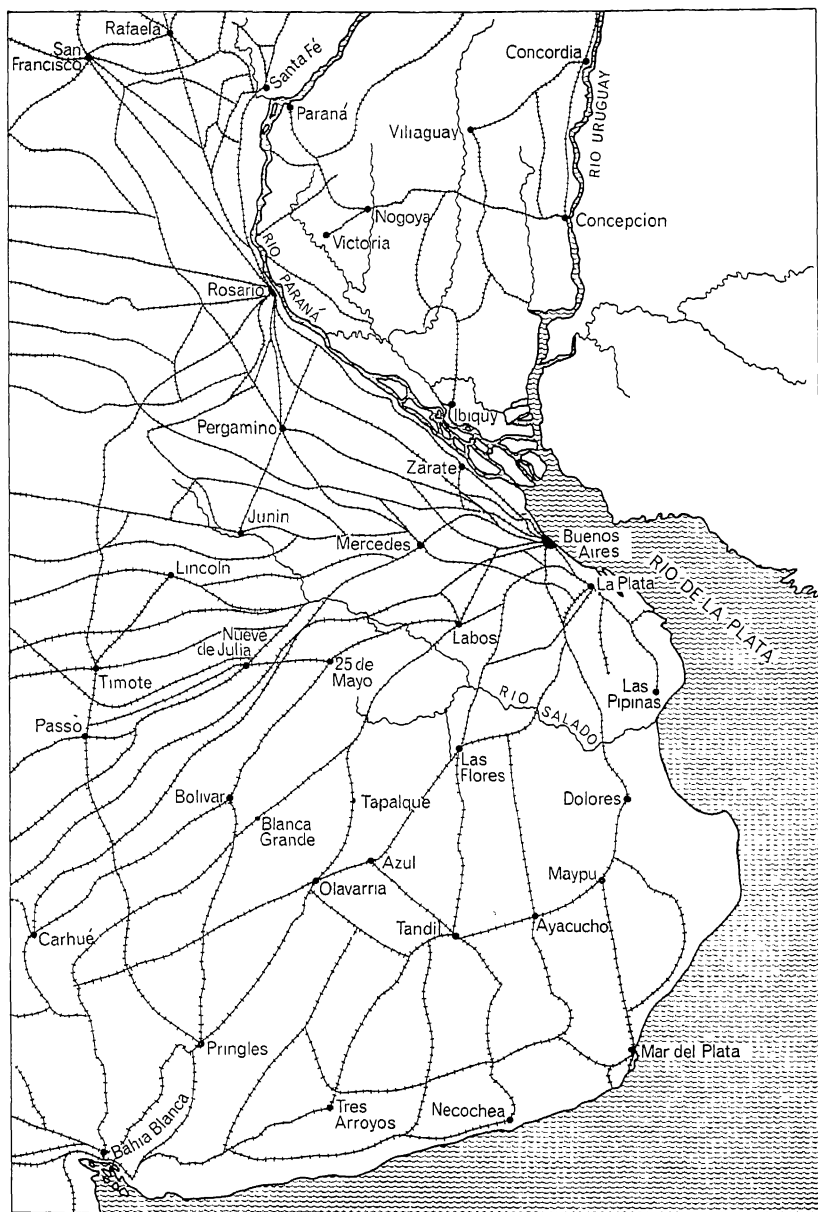


FIG. 115.—The railway network of the Pampas.

with eighteen adjoining districts, the whole forming a single continuous built-up area stretching for some 35 miles along the shore of the Plate estuary and penetrating inland for a distance of about 20 miles. This great agglomeration with a total population, according to the 1960 census, of 6,763,000 forms the fifth largest urban area in the world.

La Plata (410,000), capital of Buenos Aires province, lies on the estuary 35 miles south of Buenos Aires. It is a modern city not yet a century old. It has one of the finest ports in the republic, which can take the largest vessels, and so functions primarily as a major exporting centre. It possesses *frigoríficos* (slaughter houses and freezing plants) and oil refineries. It is also an important cultural centre with university-colleges, schools, museums, and an observatory.

Rosario (761,000), the second city of the republic, lies some 200 miles upstream from the capital. It is primarily a marketing and shipping centre for the agricultural produce of its hinterland, but it has various industries, among which are flour milling, sugar-refining, and the making of bricks, furniture, and confectionery.

Santa Fé (275,000) is 310 miles upstream from Buenos Aires, the northernmost town of the pampas and a river port serving the fertile land round about and the interior oases cities of Córdoba and Tucumán.

Bahía Blanca (110,000), the most southern city of the pampas region, has an excellent harbour in Ingeniero White (for the town itself is not on the coast) and is chiefly concerned with the export of grain and wool; it also acts as the southern entrepot for the pampas.

THE GRAN CHACO

The Gran Chaco, which means "the great hunting ground," is a vast lowland occupying the north of Argentina between the Andean foothills and the Paraná river and extending into Paraguay and Brazil. This broad stretch of, in part forested in part marshy, plain is largely a wilderness. It is the least known and least developed region of Argentina. It has a sub-tropical climate, with hot, wet summers, which alternate with a long dry season. During the rainy summer extensive shallow lakes and swamp areas develop in many areas, partly due to the rivers, which, flowing over the level lowlands, have ill-defined channels and spill over on to the land. Vegetation cover varies: sometimes dense forest occurs, but more usually a sub-tropical bush interrupted by areas of savanna or marsh is characteristic. The northern province of Corrientes in the Mesopotamian region, *i.e.* the land lying between the Rivers Paraná and Uruguay, may be included in the Chaco region, just as the southern province of Entre Ríos is included in the Pampas region. Some geographers prefer to distinguish the Mesopotamian region as a major geographical region of Argentina.

Most of the Chaco lowland is inhabited only by scattered groups of Indians who live a primitive life roaming the plains. Only in favoured localities has colonisation been effected. The opening up of the Gran Chaco has been handicapped by a number of factors: the remoteness from the sea, its inaccessibility, the difficulties of travel, the uncertainty of the water supply, the plagues of insect pests, and the hostility of the Indian tribes. As a result of these hindrances and limitations the Chaco is a land of sparse population and underdevelopment. Immense potentialities exist, however, and significant developments are likely to take place here in the future.

So far such developments as have occurred have been in three main directions. First, along the Paraná-Paraguay river, in a belt of varying width, but sometimes up to 200 miles wide, quebracho cutting is carried on. Quebracho is a very hard wood yielding a soluble tannin of great value for the leather trade. Eighteen factories are engaged in extracting tannin. Just over 200,000 tons of extract are produced annually. Secondly, along the southern margins of the Chaco some progress has been made in agriculture; here, in a zone extending from the River Paraná to the town of Santiago del Estero, the cultivation of food crops and, more especially in recent years, of cotton is carried on. Over 1 million acres are devoted to cotton plantations in Argentina, 80% of which are located in the Chaco. The possibilities for expansion are numerous, but labour problems, transportation difficulties, and the ravages of the locust are likely to hinder any great extension of cotton growing in the near future. Thirdly, in the far west along the Andean foothills cattle-rearing is carried on; unfortunately, the region is not free from the cattle-tick, with the result that only hardy breeds can be reared, and they tend to be inferior.

The only other significant development in the Chaco is the exploitation of petroleum. Oil has been found in the upper Bermejo valley, near Tartagal, and is being exploited. Exactly how extensive and how rich these oil deposits are it is impossible to say at present.

Much of the province of Corrientes, particularly the north-eastern part, resembles the Chaco and may, in fact, be looked upon as an outlying portion of the Chaco region. Here is the same climatic regime, the same marshy lake-strewn terrain, and the same lack of population and development.

Cattle of the unimproved criollo type are reared on the poor, rough pastures. The cattle tick is troublesome here. Rice is cultivated in the far north along the Paraná between the towns of Corrientes and Posadas. Oranges also grow well in this area.

Lack of communications is a serious drawback to the penetration, occupation, and exploitation of the Chaco. A railway runs along the southern margin of the region from Santa Fé to Santiago del Estero, and in the north the recently completed Formosa railway runs from Formosa to Embarcación. About midway between these two railroads a motor highway runs from Resistencia to Salta. Large areas remain unserved by any kind of highway. Pack-mule and bullock-wagon often form the only means of transport. Towns are few and chiefly occur on the edge of the Chaco. Resistencia (50,000), capital of the Chaco country, lies on the Paraná in one of the most progressive districts in the north. It is a thriving centre very largely concerned with forest products. Almost opposite to it lies Corrientes (56,000), also of growing importance. Santiago del Estero (70,000), on the western borderlands, was founded by the Spaniards as long ago as 1553.

In the extreme north-east lies the province of Misiones, an enclave surrounded by Paraguay on the west and by Brazil on the north and east.

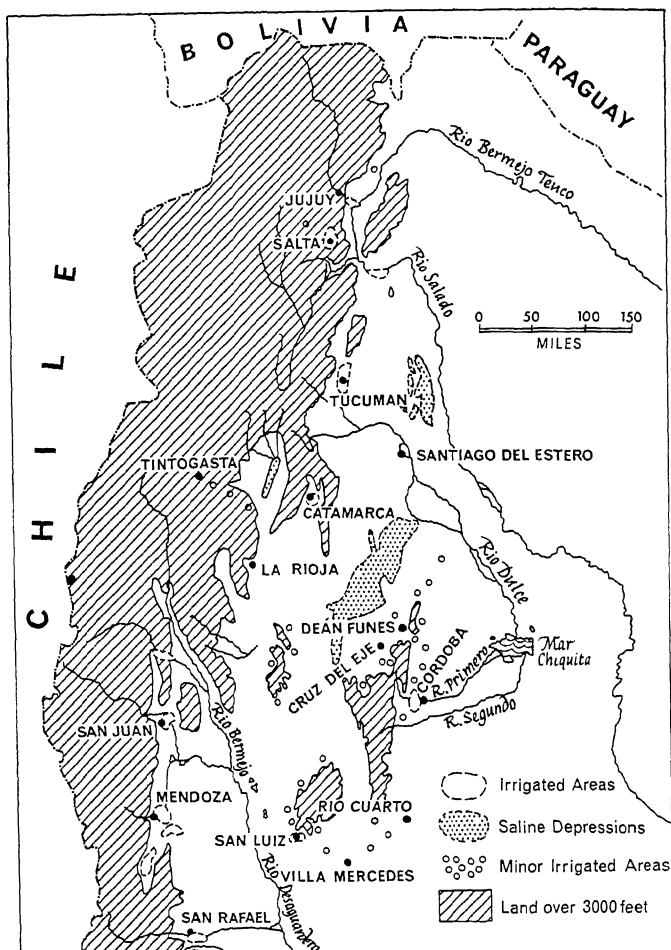


FIG. 116.—The oases of Western Argentina. Except in the north irrigation is essential for agriculture. In the Sierras de Córdoba there are several dams providing water for irrigation, power, and municipal purposes. Resorts have grown up around these artificial lakes.

The land is higher here, much of it lying above 1000 ft. The rainfall is also much higher, and so much of the country is covered with mixed forest comprising cedars, pines, and broad-leaved species. Yerba maté grows wild in the forest. The tung tree is now cultivated in this area, its fruit yielding an oil which is especially valuable in the preparation of paint. The region possesses considerable hydro-electric potential, but, unfortunately, it lies far removed from Argentina's main industrial areas. Posadas (45,000) on the Paraná, opposite the Paraguayan town of Encarnación, is the provincial capital.

It will be apparent from the foregoing account that the problems besetting development in the Chaco are many and that pioneering may be peri-

lous as well as difficult. The potentialities of the region are beyond dispute, but their realisation lies in the future, and whether the near or distant future depends upon a variety of imponderable political, economic and social factors.

THE ARID WEST

The Arid West or Sub-Andean region, embracing about one-fifth of Argentina, lies between the Cordillera of the Andes and the lowlands of the Chaco. The region has only slight rainfall, about 10–20 in. and sometimes less than 10, as a result of its interior situation. It is too far removed from the sea to benefit from moist Atlantic air-streams, and no rain-bearing winds reach it from the Pacific side. The natural vegetation varies, but dry steppe, scrub, and dry forest cover most of the area. Topographically the region exhibits considerable variety: hill ranges, depressions, valleys, and plains are all to be found in a rather complex and confused fashion.

The region is lacking in prosperous agricultural activity except in the oases. The latter, which are irrigated by streams flowing down from the snow-clad Andes, form fertile, productive pockets in an otherwise barren setting. The oases of Jujuy, Salta, Tucumán, Córdoba, San Juan, Mendoza, San Luis, and San Rafael have become vital centres of agricultural production, producing a wide variety of commodities of great value to the country as a whole. Two specialised crops—sugar-cane and vines—are cultivated in the Arid West: the former being grown in the northern part, the oasis of Tucumán being the chief centre; the vine, for grapes and wine production, farther south, especially around Mendoza and San Juan. Besides these specialised cash crops, wheat, maize, and rice, pomaceous and stone fruit, vegetables, and tobacco are grown for local consumption. In all these oasis settlements of the west irrigation is of paramount importance: without artificial water supplies they could not flourish.

Apart from oasis cultivation, stock-raising is virtually the only other occupation of the people. On the scanty vegetation of the *monte* cattle are pastured and fattened on alfalfa, which is grown in the valleys. Goat-rearing, a development of comparatively recent times, is also carried on in this arid region. Some sheep are reared. Beef of inferior quality, goat skins, and wool are produced.

Most of the towns are old settlements dating from the early days of the Colonial Era. The trade routes from the mines of the Peruvian and Bolivian plateaus descended to the plains of the sub-Andean zone and crossed them on the way to Buenos Aires. At a number of halting points on these trails centres arose which initially lived by rearing mules for the transport trains and cattle. To this day considerable numbers of mules and cattle are raised and exported to Bolivia and northern Chile. Settlements such as Salta and Tinogasta grew up where there were favoured spots which enabled stock-raising to be carried on and allowed of their easy despatch to other parts of the Vice-Royalty. The modern growth and importance

of the settlements of the Arid West has been dependent mainly upon the coming of the railway, which has linked them to the centres of the populous Plate estuary.

About a dozen oases are important. Tucumán (258,000) is the centre of a wide area producing sugar-cane and is the largest and busiest town of the north. To the north lie Salta (91,000) and Jujuy (60,000), both picturesque colonial towns, which are also centres of districts chiefly engaged in the cultivation of sugar-cane. Near Jujuy, recently renamed San Salvador de Jujuy, is mined most of the lead and zinc produced in the country—about 25,000 tons of each. Also, the only iron-ore deposit worked at present occurs at Zapla, and here is a blast furnace turning out 430,000 metric tons of pig iron annually. The ore is smelted by charcoal. In the south-central part of the region lie Córdoba (635,000) and Mendoza (165,000), San Juan (140,000), San Luis (37,000), and San Rafael (32,000). Córdoba ranks next to Lima in age and is the seat of a university which dates back to 1613 and was the first to be established in South America. Attractive in itself, Córdoba is situated in a district of exceptional beauty with the result that it has become a mecca for tourists and holiday-makers. Near Córdoba is the Fiat Industrial Centre, where there are three large factories making railway locomotives, tractors, motor cars, and diesel engines. Córdoba has now become Argentina's second largest industrial centre. The vine is extensively cultivated around Mendoza which has become a wine-making centre; so fruitful is the district around Mendoza that it has been dubbed "the garden of the Andes." It is also a growing centre of petroleum production. Mendoza lies near the eastern entrance to the Uspallata Pass, the mountain throughway which links Argentina with Chile.

The oilfields near Salta (Campo Duran and Madrejones) are the richest and most productive in Argentina and largely account for the recent great increase in output. An oil pipeline from Campo Duran to a refinery in San Lorenzo (Sante Fé) came into service in 1960, as did also a natural gas pipeline from the same source to Buenos Aires.

The large proportion of rugged terrain and the general aridity of the region have long retarded, and continue to retard, expansion. Extension of the irrigated area, the development of hydro-electric power, and exploitation of the varied but as yet little touched mineral wealth would enhance the economic importance of the Arid West. It seems likely that the dominant centres of activity will long continue to be the oasis settlements. As irrigation facilities are improved so will these oasis centres expand and prosper. In all parts of the Arid West progress has been conditioned by transport and the opening up of any new areas will continue to be dependent upon this factor.

PATAGONIA

The region of Patagonia lies south of the Río Colorado. Administratively it consists of the three territories of Río Negro, Chubut, and Santa

Cruz. The eastern part of the island of Tierra del Fuego is also Argentinian territory and may be included in the region. In almost every respect Patagonia shows marked contrasts with the Pampa: a dissected plateau replaces the dead-level plains of the pampas; poor soils and gravelly surfaces take

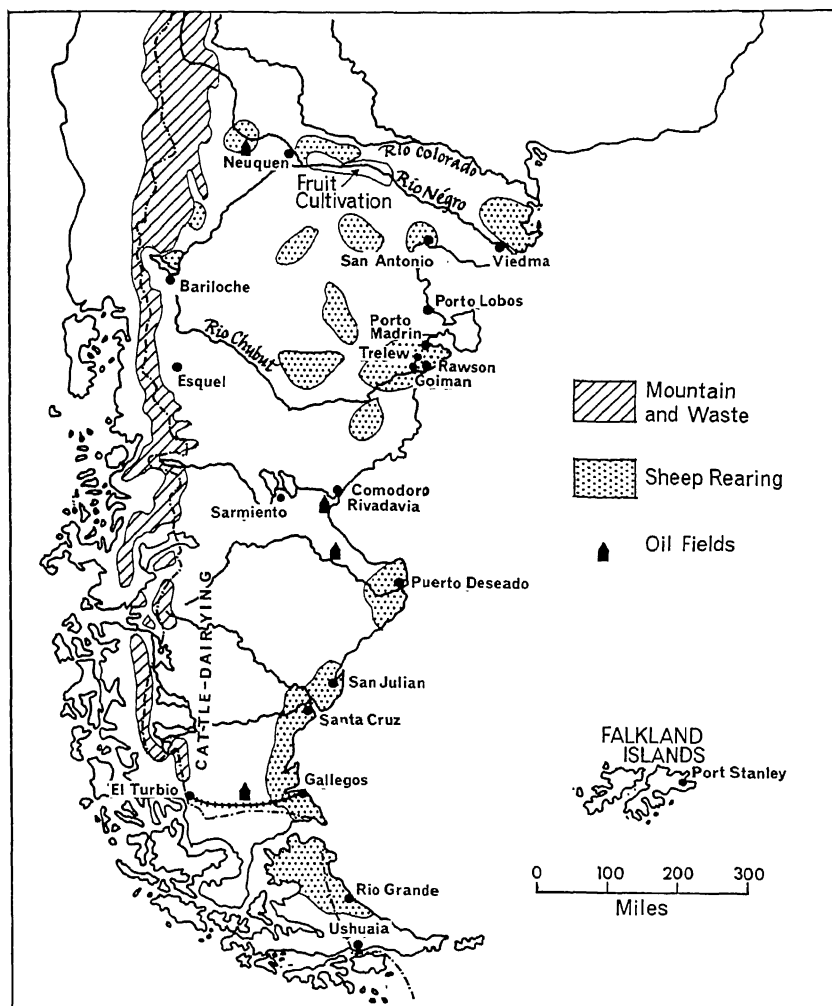


FIG. 117.—Patagonia: general features.

the place of the fine loams; low rainfall replaces the sufficient and well-distributed precipitation of the pampas; and the population of Patagonia is sparse.

Except near the mouths of the larger rivers there is practically no coastal plain; indeed, in many sections there is a high cliffed coast. The interior consists of a series of plateaus which average between 1000 and 3000 ft in

height, but in places attain an elevation of 5000 ft and over. In the west the plateau stops abruptly and overlooks a depression at the foot of the Andes. This well-marked pre-cordilleran trough is recognisable throughout the length of the region, *i.e.* as far north as 41 degrees S. Within this sub-Andean depression occur many beautiful lakes which owe their origin to blockage by volcanic material or glacial detritus. Thus, in a broad way, three parallel zones may be distinguished in Patagonia, *viz.* the coastal, the plateau, and the trough. The rivers which flow across the Patagonian Plateau have cut deep, steep-walled valleys into the surface, and the succession of trenches eroded by the Negro, Chubut, Deseado, Chico, and Gallegos rivers form a topographic feature of a very striking nature. It is in these canyon-like valleys that most of the settlement has taken place.

The scanty rainfall, which in few areas exceeds 10 in., comes mostly in winter and is brought by winds from the Pacific which surmount the barrier of the Andes. The Andes do act as an obstacle to the storms which assail southern Chile, thus only a small fraction of the moisture they bring penetrates into Patagonia. Moreover, the cold ocean current which flows equatorwards along the Patagonian coast robs the Atlantic winds of their moisture, so that precious little rain is to be had from this source either. Temperatures on the whole are moderate, but summers are decidedly cool. The most unpleasant feature of the climate is the wind, which blows constantly and strongly, sometimes violently. Except along the western margins and in the extreme south, where there is a greater amount of rainfall which permits grassland, the natural vegetation is mainly either desert or semi-desert. A grey, xerophytic vegetation of scrub plants and sparse tussock grass covers wide areas. Away from the rivers in this vast arid region, water is exceedingly scarce; natural springs and water-holes are few and far between. It is this lack of water that is the major handicap of the region.

When Patagonia was first discovered the land was inhabited by primitive Indian peoples who hunted the guanaco. These Indians remained the masters of the wild and barren plateaus until the early 'seventies of last century. Then settlers, largely British in origin, began to occupy the country and commenced raising sheep mainly for their fleeces. The Indians were driven into the more inhospitable parts of the Patagonian desert or up into the Andes, where they continued their life as nomads and hunters, ever decreasing in numbers. The remnants of these half-civilised Indians live a wretched and pathetic existence. Only a few hundred of them remain. Patagonia as a whole is very sparsely populated, and all told there are less than 250,000 people in the region.

The raising of sheep, mainly for wool, is the chief economic activity. Approximately one-third of the 50 million sheep in Argentina are to be found in Patagonia, especially in the southern part in the provinces of Chubut and Santa Cruz, which have $5\frac{1}{2}$ and $8\frac{1}{2}$ million head respectively. Less than 1 million are pastured in Argentine Tierra del Fuego. Inceas-

ingly Patagonia has become the chief sheep-rearing region of the country as the cultivation of grain and the raising of cattle have squeezed sheep out of the pampas. Patagonia is by no means fully stocked, and there are large well-grassed areas which could support increased numbers. The average output of wool is about 50,000 tons a year. Much of the wool is shipped from Punta Arenas (Magallanes) on the Straits of Magellan and Río Gallegos not far from the eastern entrance to the Straits. Quantities of meat are also exported, and there are a number of *frigoríficos*, *e.g.* at Santa Cruz, Río Gallegos, San Julian, Puerto Deseado, and Río Grande.

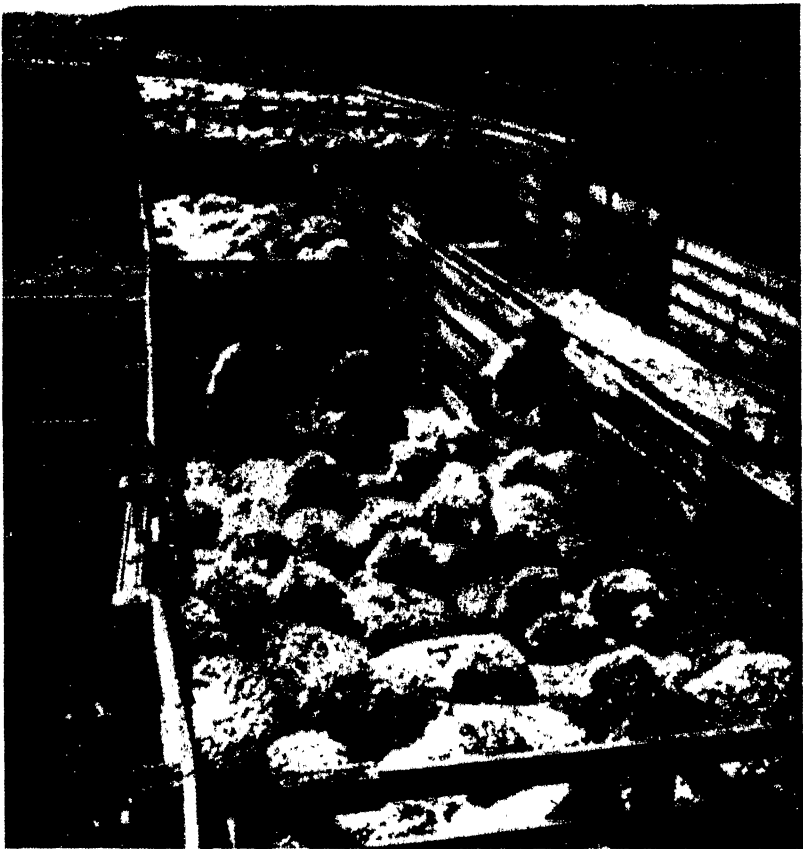


FIG. 118.—Sheep in Patagonia. Shepherds are studying the teeth of the sheep to find the good grazers. The shearing season offers a good opportunity to separate breeding ewes from those destined for the packing shed.

Although Patagonia is pre-eminently a sheep country and likely to remain so for a long time, there have been developments of a different kind in one or two other places. In the northern part of Patagonia, especially in the valleys of the Río Colorado and Río Negro where moisture

is available, crops can be grown by irrigation, and considerable areas are devoted to cereals, alfalfa, vines, and pears. Again, in the pre-cordilleran trough a heavier rainfall, sometimes supplemented by irrigation, enables small grains, alfalfa, and vegetables to be grown, all of which are consumed locally. In spite of these local developments, arable farming plays a relatively insignificant role in the region's economy.

Near Comodoro Rivadavia in the Chubut valley petroleum is found. This is Argentina's chief oil-producing district. The wells are owned and operated by the Government. A considerable proportion of Argentina's oil output of some 98 million barrels comes from the Chubut field. Natural gas also occurs here, and a pipeline carries the gas from Comodoro Rivadavia to Buenos Aires nearly 1000 miles away. Farther south in Santa Cruz State is the El Turbio coalfield, which accounts for about 95% of Argentine coal production, which all told is only about 300,000 tons a year, although current plans aim to increase total production to 1 million tons annually. A railway has been built from El Turbio to the port of Río Gallegos.

THE ANDEAN REGION

The Andean region occupies the eastern slope of the Andean Cordillera, the Pre-Cordillera, and the high plateau of the extreme north-west. Two sections may be distinguished, the northern arid mountain area, north of the 40 degree parallel, and the southern section, the wooded mountain



[Courtesy: B.O.A.C.]

FIG. 119.—San Carlos de Bariloche, to give the town its full name, on the southern shore of Lake Nahuel Huapi, is the best centre for exploring the National Park in Argentina's Southern Lake District. The town (18,000) is situated on an old glacial moraine at the foot of Cerro Colorado and its wooden chalets are perched Swiss fashion along steep streets.

area. A variety of minerals occur in the mountain zone, but deposits of most of them are either poor or inaccessible. Copper, silver, lead, zinc, tin, and boron are worked in small amounts. In the south the mountains are not as high and the slopes receive some rainfall. Beechwoods clothe the lower slopes, and considerable tracts of good grazing land occur in the foothill zone. Some cattle are reared here, and it offers potentialities as a dairying region. The lake country offers possibilities for tourism (see Fig. 119).

URUGUAY

Uruguay, territorially the smallest of the South American republics with an area of 72,180 square miles, has exercised an influence in the Latin American world altogether at variance with its size. As Professor F. A. Kirkpatrick has said,* "she has taken an advanced place in the inter-American system, and may even claim to have shown the way to some of her bigger neighbours both in cordial international relationships and also in the conduct of civic life through a series of bold constitutional experiments and a vast increase of social services, including free education in every grade." Uruguay provides another example, if further proof be needed, that a country need not necessarily be large or great to make worthwhile contributions to society. New inventions and techniques, improved ways of life, cultural advances, and spiritual leadership have often come from the small, and politically inconsequential, states, *e.g.* Switzerland, Holland, Denmark, Iceland. Progressive, democratic, and politically stable, Uruguay is almost the antithesis of the "typical" South American state.

POSITION AND HISTORICAL ORIGIN

What, it may be asked, has geographical location to do with the origin and political development of a state? Quite a lot, as the case of Uruguay demonstrates.

Uruguay or La Banda Oriental ("the Eastern Side"), as it was called in the Colonial Era, was originally occupied by a tribe of Indian nomad hunters, the Charruas. During the eighteenth century, as Spaniards from the settlement of Buenos Aires began to use the grasslands for cattle-raising, the Charruas were gradually eliminated. Montevideo was founded in 1727 and became the capital of the region, which was officially annexed in 1778. Meanwhile the Portuguese in Brazil were gradually expanding southwards, and during the period 1817-29 overran the province, occupied Montevideo, and annexed the Banda Oriental, re-naming it the Cisplatine Province. The Spaniards of Argentina, however, had no intention of relinquishing the territory, and a struggle ensued between them and the Brazilians for the possession of the province.

Hostilities dragged on for a number of years, with little prospect of any

* "Uruguay," *Geogr. Mag.*, Vol. XV, 1942. Pp. 274-284.

decision. Eventually the British minister at Río de Janeiro suggested that Argentina and Brazil could solve the impasse by agreeing to recognise the disputed territory as an independent state. This proposal was accepted, and the Uruguayan Republic was inaugurated in 1829. It has been suggested that this was an adroit move on the part of Britain—and maybe it was—to prevent Argentina from securing control of both banks of the Plate estuary, a control which might have interfered with British trading interests in the area.*

From the map Uruguay appears to have a precarious position: it looks like a political remnant in danger of being squeezed out of existence and swallowed up by either Argentina or Brazil, her two big neighbours. While physically and historically Uruguay belongs to the Pampas, thereby providing Argentina with strong claims to the area, the Plate estuary would seem to provide the natural frontier for Brazil, whose present boundary at the southern end of the panhandle stops short some 200 miles from the Río de la Plata. However, though Uruguay's freedom and security may well have been in jeopardy in the past, its present function as a buffer state between rival republics ensures its continuing sovereignty and independence.

THE PHYSICAL BACKGROUND

Uruguay is compact in shape, with a sea coast of about 120 miles, a short-line on the Plate estuary of 235 miles, and a river boundary of 270 miles along the River Uruguay. Though physically an eastward extension of the Argentinian Pampas, the southern part of Uruguay is an undulating plain, grass covered in its natural state, but with ribbons of trees or scrub vegetation in the valley bottoms. The topography of a gently ridged and rolling character stands contrasted with, and is far from being a continuation of, the monotonously level plains of the Pampas. The ridges of low hills, known as *cuchillas*, separate wide, flat-bottomed valleys in which streams meander sluggishly. The numerous streams also strike a note of contrast with the Argentinian Pampas, which are virtually devoid of surface drainage. Towards the Brazilian boundary the landscape changes: the wide, rolling, grassy plain gives way to a more varied terrain, with hill ridges, rocky and wooded, alternating with broad but rather deeply incised river valleys. This northern section is really an extension of the Brazilian highlands, though nowhere are elevations greater than 2000 ft.

While a number of small streams drain eastwards from the Cuchilla Grande in eastern Uruguay towards Lake Mirim, which borders the Atlantic coast, the principal river is the Río Negro, which runs from the north-east towards the south-west. The River Uruguay, which demarcates the western boundary, is flanked by low, level banks and occasionally, as in the summer of 1959, disastrous flooding may occur, inundating large areas. The eastern coastline is backed by tidal lakes and

* PEARCY, G. ETZEL, and Associates. *World Political Geography*, 2nd Edition. New York. 1957. P. 195.

small lagoons and fringed with sand dunes; the southern coastline is flat and alluvial, although there are magnificent stretches of sand which have provided Uruguay with wonderful beaches, now fully exploited for recreational purposes.

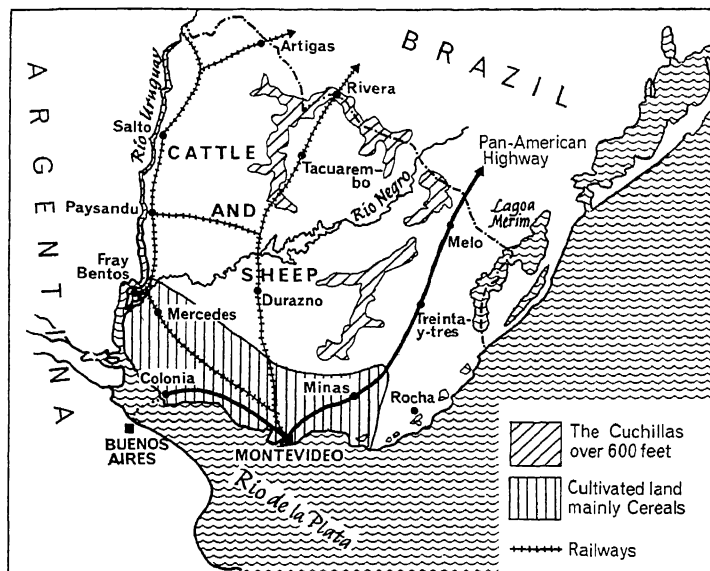


FIG. 120.—Uruguay: general features.

The climate is sub-tropical, with warm summers (average January temperatures are 71° F) and short, mild winters (July, the coldest month, has an average of 50° F). While high midday temperatures are not uncommon during the summer months, easterly maritime winds prevail at this season and so temper the heat. Although occasional cold spells may be experienced during the period June to August due to chill southerly winds, frost is extremely rare. Variability is one of the outstanding features of the climate. Day-to-day changes frequently occur—the result of cyclonic activity—and sudden shifts in wind direction take place: the hot *zonda*, blowing from the north, may be quickly replaced by the cold *pampero* coming from the south-west. Windiness, indeed, is one of the distinguishing characteristics of Uruguayan weather. The mean annual rainfall is about 35 in., though the amount decreases in inland locations. There is a fairly even distribution of precipitation throughout the year, and the climate generally is somewhat damp, although this does not preclude periodic droughts. A feature of the summer season is the *tormenta*, a sudden convective thunderstorm of a quite localised nature.

Altogether, the physical conditions of Uruguay—its easy accessibility, its rolling plains, its rich black soils, and its invigorating climate—make it an attractive land.

THE HUMAN BACKGROUND

The aboriginal Indians, who lived in small, scattered groups following a nomadic existence, were never numerous, and during the Colonial period were gradually decimated, the remnant, escaping destruction by either fighting or disease, becoming absorbed by the Spanish settlers. The latter brought with them Spanish culture, and this became so firmly rooted that to this day Uruguay is basically Spanish in its character in spite of the great influx of Italians, French, and English during the nineteenth century. The common tongue is Spanish, and the Roman Catholic Church has most adherents.

The total population is slightly over 3 millions. Almost all the people are white and are principally of Spanish or Italian descent. An estimated 10% of the population may be classed as mestizo, the majority of whom live in the more remote areas of the country. One outstanding feature of the population is the concentration of one-third of it in the capital city of Montevideo. Moreover, apart from Montevideo, large towns are absent; there is no other town with a population of much more than 50,000.

Uruguay's early economic development owed almost everything to British enterprise and Italian labour. While the British were largely responsible for the development of the pastoral industry, the railway system, and the public utility services, the Italians provided the necessary labour without which enterprise would have been nullified and economic expansion rendered impossible. Kirkpatrick summed up the respective roles and contributions of the Italians and British when he wrote: "Italian labour has been the complement of British capital in furthering national progress."*

THE URUGUAYAN ECONOMY

During the first half of Uruguay's 130-year-old existence as an independent country economic development was handicapped by the bitter rivalries between the two dominant political parties, the Colorados and the Blancos. These two rival groups—broadly equated as socialist and conservative parties—are still in existence. For the past sixty years, however, the Colorados have been in power, and Uruguay has been transformed into a relatively prosperous and democratic country earnestly carrying forward the social and economic ideals of its greatest leader, José Batlle y Ordóñez (1856-1929).

Uruguay is primarily a pastoral and agricultural country in which the pastoral industry predominates, some 68% of the total area, approximately 34 million acres, being devoted to stock-raising. Land utilisation is as follows:

| | % |
|------------------------------------|------|
| Permanent meadow and pasture . . . | 67.7 |
| Arable and orchard . . . | 12.3 |
| Forest and woodland . . . | 2.7 |
| Waste, built-up areas, etc. . . | 17.2 |

* *Op. cit.* P. 279.

Grazing is carried on in the northern four-fifths of the country. Here cattle and sheep are raised on large estancias and animal products—wool, meat, and hides—constitute about three-quarters of Uruguayan exports. For many decades the numbers of cattle have changed but little, totalling around 8 millions, though in recent years the numbers have fallen by about one million head. Sheep, on the other hand, have gradually increased in numbers during the past forty years as Table XIV indicates.

TABLE XIV
Uruguay: livestock (in millions)

| | Cattle | Sheep | Pigs |
|------|--------|-------|------|
| 1924 | 8.4 | 14.5 | |
| 1937 | 8.3 | 17.9 | 0.3 |
| 1946 | 6.8 | 19.6 | 0.4 |
| 1951 | 8.3 | 23.0 | 0.27 |
| 1956 | 7.3 | 25.0 | 0.25 |
| 1962 | 8.6 | 21.5 | 0.25 |

Sheep are now the most important animals and are reared almost exclusively for their wool, there being as yet very little production of mutton or lamb. The wool clip reached its peak in 1953–54 with 203 million lb; during the 1957–58 season it amounted to 200 million lb, approximately 4% of the total world output. During the 1959–60 season wool production was reduced by 25% on the 1957–58 figure. This drop illustrates how closely the livestock industry is geared to climate. During recent years Uruguayan production has suffered from adverse weather conditions.



[Courtesy: B.O.A.C.]

FIG. 121.—Gaucho driving stock, Uruguay.

Heavy flooding of the grazing areas led to a 9% fall in the sheep population between 1958 and 1959. Government encouragement of the wool processing industry—now the country's second great processing industry—has meant that only half the wool is exported in grease. Currently, wool provides almost two-thirds, by value, of Uruguayan exports.

The cattle industry forms the basis for Uruguay's meat-packing industry. Uruguay has four great *frigoríficos*, three of which are foreign-owned; three of the *frigoríficos* are located in Montevideo and one in Fray Bentos. *Saladeros* (packing plants) and canning factories are also found in these two towns and in Paysandu, Salto, and Artigas. The meat-packing industry is less prosperous than hitherto, and there has been a rapid decline in meat shipments. The *frigoríficos*, which have an annual capacity of 1,700,000 head of cattle, averaged only half a million slaughterings a year during the 1951-57 period. At the present day about half the *frigorífico* capacity is shut down. Meat exports have declined from an average of about 143,000 tons annually in the immediate pre-war years to 100,600 tons in 1949-51, 80,700 tons in 1952-54, and 32,500 tons in 1955-56. Recently they have recovered a little.

A recent development, encouraged by the Government, has been the expansion of arable farming. A quarter of a century ago cereals for domestic consumption had to be imported in quantity: today there is an appreciable surplus of wheat available for export. The principal crop is wheat, to which about 1½ million acres are devoted. Maize comes next with nearly 1 million acres. These two cereals occupy about half the total cultivated area. The other chief crops are linseed, sunflowers, oats, barley, sugar-beet, and fruits (chiefly grapes, apples, and oranges). Altogether, however, only about 4 million acres are under cultivation—very roughly 1 acre in 10—and the cropland is mainly in the extreme south of the country.

Another new trend in the Uruguayan economy has been the rapid growth of industry. This is a feature which, as we have seen repeatedly, is common to most Latin American countries. But, outside the processing industries connected with stock-raising and crop farming, comparatively few people are employed in manufacturing industries, which, in the main, are concerned with the production of consumer goods. The principal industries are textiles, metal goods, chemicals, paper and cardboard, together with a fairly wide variety of other light industries of lesser importance. Unfortunately, Uruguay has very few advantages for successful industrialisation. There are no significant mineral deposits and little in the way of fuel resources. Apart from the raw materials from her farms and some hydro-electric power, Uruguay is almost wholly dependent upon imported industrial raw materials and fuels. Uruguayan manufactures, other than wool- and food-processing, which cater for the home market, and which now meet about three-quarters of the country's requirements for consumer goods, have to be protected by tariffs and quota restrictions. Although about half the industrial enterprises are scattered about the in-

terior, the larger plants and factories and the greater part of the capital investment occur in the Montevideo area.

COMMUNICATIONS AND TRADE

Uruguay is well served with roads and railways. There are just over 3000 miles of highway in the country, and all-weather roads radiate from Montevideo to the chief towns. Uruguay's roads are, indeed, among the best in the continent, due partly to the availability of road metal. A section of the Pan-American Highway runs from Colonia via the capital northwards to Rio de Janeiro. Montevideo is also the hub of the railway system; four main lines converge upon it. The 1874 miles of railroad, on the 4 ft 8½ in. gauge, were originally British built and owned. They were sold to Uruguay in 1948.

Approximately three-quarters of Uruguay's exports are accounted for by four items, wool, meat, hides, and skins. Other agricultural products make up the bulk of the remainder. Holland, Britain, and the United States are Uruguay's principal customers. Uruguayan imports consist mainly of industrial raw materials, petroleum, machinery, motor cars, and other manufactured goods. The chief suppliers of imports are the United States, Britain, and other Western European countries.

URUGUAY: REGIONS

THE RANGE LAND

Although Uruguay as a whole may be said to form a single natural unit, two regions may be distinguished on a basis of differences in land utilisation: in the interior pastoralism is predominant, in the southern coastal belt arable farming.

Over the northern three-quarters of the country commercial grazing is dominant. The rolling plains are devoted to the rearing of cattle and sheep on the native pasture lands. For several hundred years the herding of animals has been the characteristic activity of the Uruguayans, an industry which has been favoured by the good grassland, the mild climate, and during the later phases of the industry, the overseas demand for livestock products. While, on the whole, conditions are very favourable for the livestock industry, occasional droughts and locust plagues may bring serious consequences.

In the early days of the industry herds of half-wild cattle roamed the open ranges under the supervision of gauchos, who periodically rounded up the animals. Cattle were reared chiefly for their hides and tallow, since means of preserving flesh other than by drying or salting, had not been developed. By the middle of the nineteenth century, however, a considerable export trade in charque meat, chiefly to Brazil and the West Indies, had begun to develop. This was followed by the production of meat extracts—a process discovered by a German scientist, Baron Liebig, who

established a factory at Fray Bentos—but it was not until the refrigeration process was invented and the canning of meat undertaken that the meat export trade began to assume major proportions.

As in Argentina, the animals are grazed on large, fenced estancias. The owners, or *estancieros*, usually of European lineage, are prosperous and live in large houses set amidst groves of trees. The *puesteros* or pasture tenders and the *peons* or farm labourers dwell near by in small houses. The estancia headquarters also has barns, shearing sheds, storage buildings, etc. Many of the *frigoríficos*, *saladeros*, and canning plants own their own ranches and meet much of their requirements from their own herds. The cattle industry, however, is having a lean time, and the farmers are turning more and more to sheep-rearing because of the greater demand for, and higher market value of, wool.

Because of the nature of the economy in the interior, population is sparse. There are relatively few towns, and the majority of these are small: most of them are livestock and shipment centres. The river ports of the Uruguay are the largest centres. Fray Bentos (20,000), the first port upstream, is almost entirely concerned with the meat-preserving industry. Nearly 20 miles to the east of Fray Bentos is Mercedes (35,000), situated on the south bank of the Río Negro just before its confluence with the River Uruguay; an agricultural and livestock centre, it is connected by railway to Montevideo. Paysandu (60,000), just over a hundred miles up the Uruguay, is another great centre of the meat-packing industry; in addition, it has tanneries, breweries, distilleries, and soap and footwear manufactures. Salto (60,000), about 50 miles north of Paysandu, is a river port (at ultimate point of navigation on the Uruguay) and is also a city closely linked with the pastoral industry. Around the town are large groves of orange and tangerine trees, a feature that has earned it the title "City of Oranges."

Near Salto is the site for the proposed Salto Grande Scheme. This is a grandiose project for harnessing the River Uruguay: it would produce 6000 million kWh annually, provide irrigation water, and improve river navigation. This multi-purpose project was for long merely a hope for the future, being dependent upon co-operation between Argentina, Brazil, and Uruguay and the availability of an outside source of capital. Towards the end of 1963 a treaty was signed in Montevideo which cleared the way for the realisation of the project. At Rincón del Bonete at the western end of Lake Río Negro is a 114,000-kW hydro-electric plant. A little farther downstream the Rincón de Baygorría hydro-electric scheme, deriving its power from the already existing Lake Río Negro, came into operation in 1960. This will provide electric power for the interior, since the Rincón del Bonete station supplies mainly the capital and its vicinity. In the far north of Uruguay are the frontier towns of Artigas and Rivera, while in the east is Treinta y Tres. Melo (28,000) is a provincial capital and distributing centre in the north-eastern part of the country. A glance at the map will show how the towns

fall into a definite pattern: first, a series of river ports on the Uruguay; secondly, a series on the line of communication provided by the road and Central Railway running from the capital to the frontier town of Rivera; and, thirdly, a series on the highway which extends north-eastwards from Montevideo.

SOUTHERN URUGUAY

A strip of land, nowhere more than 50 miles wide and not extending beyond the 34 degree parallel nor much farther eastwards than the town of Minas, forms the farming and manufacturing zone. Here, in contrast to the livestock ranching which prevails elsewhere in Uruguay, is a different economy based upon tillage and manufacture. Here, also, in contrast to the sparse distribution of population in the range country, is a much higher density of population and a greater development of urban centres. Over half the total number of people live in this southern coastal belt.

The more intensive character of the land use is reflected in the greater density of the rural population and in the very much smaller size of the land holdings. The farms, commonly about 250 acres in size, are devoted principally to commercial grain cultivation, especially wheat, although lesser amounts of maize, oats, and barley are grown. Among the other crops are linseed and, oddly enough, bird seed and a number of new crops, such as ground-nuts, sunflowers, sugar-beet, and rice. About half of the farmers own their farms; the remainder are let to tenant-farmers or are run by a manager.

The Uruguayans are traditionally stock-raisers and have shown little enthusiasm for arable farming; indeed, most of the cultivation is carried on by immigrants and the descendants of immigrants. In spite of government encouragement, the increase in the acreage of cropland and in the number of farmers has been slight. Preston James* suggests there are two reasons for the slow development of commercial agriculture and the persistence of pastoralism in Uruguay: first, the excellence of the pastures did not demand the production of such fodder crops as alfalfa as did the poorer grasslands of the Argentine Pampas; and, secondly, the less dependable rainfall in Uruguay renders crop cultivation slightly more hazardous and gives rather lower yields. To these factors might be added a third: the long-continued prosperity of ranching and the constant demand for pastoral products until recent times made it unnecessary for the cattle-raisers to change over to cultivation. The decline in the cattle industry has been offset by the growth in importance of wool production, so that the *estancieros* have been saved from having to turn to crop production.

Southern Uruguay is also distinguished by its industrial development, although this is focused predominantly in the capital and its immediate vicinity. Montevideo, as the chief port and commercial centre, and the largest market in the country, is the obvious choice for the location of

* *Latin America*. P. 373.

industry. Montevideo has textile—wool, cotton, synthetic fibre, and a newly established hessian—factories, metal processing, rubber, chemical and pharmaceutical plants, newsprint and cardboard works. Just outside Montevideo is the La Teja oil refinery. At Juan Lacaze, some 20 miles west of the capital, are important woollen and paper mills. At Canelones and San José are large flour mills.

Montevideo (1,200,000), which gets its name from the isolated conical hill rising above the town, was initially sited on a low promontory, but now spreads into the flat country beyond the bay. Originally the port was merely an open roadstead, but at the beginning of the present century extensive harbour works were begun, and today there are moles and wharves furnished with modern appurtenances to handle Montevideo's large import and export trade. Montevideo is one of the handsomest cities in South America, with fine buildings, tree-lined boulevards, attractive parks, and, to the east of the town, wide, sandy beaches which have turned Montevideo into a seaside resort. Thousands of Uruguayans, and Argentinians too, from across the estuary, come as summer visitors to Montevideo. Indeed, fine beaches stretch for dozens of miles along the Atlantic coast, and a whole series of beach resorts, linked by a splendid highway, known as the Rambla, stretch alongshore. Punta del Este, situated on a headland, is a fashionable and fast-growing resort, and beyond this point there are magnificent stretches of coast with clean, white sands awaiting development. The tourist industry is a growing asset, and increasing numbers of Argentinian and Brazilian visitors are being attracted to Uruguay's bathing-resorts.

URUGUAY'S PROBLEMS

Uruguay's prosperity depends, as it has always depended, upon the export of a relatively few raw or semi-processed range and farm products. She relies, therefore, overwhelmingly upon foreign demands for such commodities. Such reliance is hazardous, however, for events completely outside the control of Uruguay, such as economic recessions, changes in dietary habits, or wars, may completely disrupt trade. Probably mindful of this, the Government sought to diversify the economy, first, by trying to expand arable cultivation and crop production and, secondly, by fostering the growth of industry. The latter approach has proved to be more successful than the former. "Internally the main trend has been the rapid growth of industry. While farming has certainly not stood still, it has neither kept pace in production nor extended its hold on foreign markets sufficiently to pay for the country's expanding requirements of machinery and industrial raw materials."* As we have already noted, Uruguay is deficient in industrial raw materials and power resources, and hence her manufacturing industries are very largely dependent upon external supplies. For a while the large reserves of capital that Uruguay had built up during and after the Second World War enabled her to buy all

* *The Times Review of Industry*, June 1958.

she required; latterly, however, as these reserves drained away, she began to live beyond her income. This has led to an economic dilemma which is not yet solved. Industrialisation has become identified with national progress, but it may well be that Uruguay will be compelled to make a reappraisal of the economic structure and to pursue a more vigorous and enlightened policy in respect to agriculture.

Internally, Uruguayan economic policies are closely bound up with politics. The Colorados, who have for long held power, represent urban, and especially Montevideo's, interests, hence rural interests have tended to be seriously neglected, and many basic public services, *e.g.* electric-power supplies, are lacking in the interior. The present economic difficulties may compel the Government to re-examine its policies with respect to industry, which flourishes only under heavy protection, and to farming, which is the fundamental basis of the economy.

Yet another problem, of a social nature, faces the republic. In spite of their inescapable dependence upon the land, the people are predominantly town-dwellers. Since the Second World War, urban growth has been rapid, and this trend is being accentuated by the drift of population from the countryside. Although this drift from the land has not yet reached a critical stage, whereby the economy is threatened, it is likely to aggravate the imbalance which already exists between industry and farming.

PARAGUAY

Paraguay, 157,047 square miles in area with a population of approximately 2,100,000, is the most backward of the South American republics. In spite of a pleasant sub-tropical climate, plenty of good agricultural land, and valuable forest wealth, Paraguay is primitive and undeveloped. Why is this so? The answer is to be found principally in two facts, one historical, the other geographical. Both these facts are worth brief consideration.

HISTORICAL BACKGROUND

Paraguay was first settled by the Spaniards in 1546, and the present capital, Asunción, was founded about this time. But Spanish occupation was short-lived, and by the end of the sixteenth century the Spaniards had abandoned the region. In 1609, however, the Society of Jesus, a missionary society of the Roman Catholic Church, began to send its members into the country to civilise and Christianise the native Indian inhabitants, the Guaraní people, who were friendly and peaceable. During the following century and a half the Jesuits established 32 settlements, or *reducciones* as they were called, and the missionaries achieved great success. Many of the Indians were induced to give up their nomadic way of life and settled in these "townships." Some of the churches which were built at this time still remain. Unfortunately, when the Jesuits fell into disgrace and were expelled, the *reducciones* were gradually abandoned by the Indians and fell into ruin.

When the Spanish Colonial Empire collapsed the people of Paraguay achieved their independence by a bloodless revolution in 1811. Shortly afterwards the country fell into the hands of a ruthless dictator, Dr. Francia, who held supreme power until 1840. Francia's policy was one of complete isolation; this policy was adopted partly through choice and partly as a result of the political conditions prevailing at the time. Francia's policy, though it prevented external contacts being made and handicapped any development of trade, served to foster national self-sufficiency and, above all, ensured Paraguayan independence.

After this prolonged period of melodramatic dictatorship Francia was succeeded by his nephew, who continued the autocratic rule but reversed the policy of isolation. The nephew was followed by his son, Lopez, the third dictator in succession. Lopez had ambitions of a military nature and desired to secure a sea outlet for Paraguay. As a result, Paraguay became involved in a disastrous war with Brazil, Argentina, and Uruguay—the War of the Triple Alliance 1865–70. The Paraguayans fought courageously against overwhelming odds, but were beaten and decimated. It has been estimated that out of a total population of just over $\frac{1}{2}$ million only 221,000 were left alive after the war, and of these a mere 10% were males. Not until recent times has the normal ratio between the sexes once again been reached. There is no doubt that this catastrophe held back Paraguay's progress.

Since 1870 Paraguay's history has been mainly concerned with the slow and painful recovery from the war, a process which received a setback in the intermittent hostilities with Bolivia between 1929 and 1935. The territory in dispute was the Chaco. A settlement was finally reached in 1938, when six neutral countries awarded three-quarters of the area in dispute to Paraguay, thus greatly enlarging Paraguay's national territory.

GEOGRAPHICAL POSITION

Paraguay's political troubles and retarded development have been the outcome, in a large measure, of her geographical position. Apart from Bolivia, Paraguay is the only South American state lying entirely inland. Though land-locked, the republic has an outlet to the South Atlantic via the La Plata river system. Nevertheless, this interior situation, resulting in relative isolation, has been a root cause of the country's backward condition. Many historians would agree that it has been the critical factor in Paraguayan history. In truth this relative isolation remains largely unbroken to this day.

Not only has Paraguay an interior location: she suffers from poor access both by river and railway to the sea, which lies several hundreds of miles away. The only practicable trade route is via the Paraná River to the Plate estuary, and even this route is severely handicapped by the winding nature of the river and its shifting sandbanks. So difficult is this natural water route that, until the coming of the railway, communications with Buenos Aires were primarily by road.



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FIG. 122.—Paraguay: general position.

Since 1913 a railway link with Buenos Aires has existed, but even this route has its difficulties: there is a break where the line crosses the Alto Paraná, and goods and passengers have to be ferried across the river to Posadas. Moreover, passenger and freight rates on this line are high, owing to the small volume of the traffic. Paraguay, too, has no direct rail connections with either of its two neighbours Brazil and Bolivia. There is now, however, a direct road link with Brazil, and railway links are projected. But this inaccessibility, along with Paraguay's interior situation, emphasises its remoteness and isolation and has militated against its economic and social development.

PHYSICAL CONDITIONS AND CLIMATE

The Paraguay River, running north-south, forms the axis of the republic, dividing it into two contrasting portions, sometimes called the Oriental and Occidental parts. Approximately three-fifths of the total area of the country lies west of the river.

The Oriental section (61,000 square miles), Paraguay Proper, is itself divided into two distinctive parts differentiated fundamentally by relief. Hence it is possible and, from the point of view of regional treatment, desirable to recognise three areas: the Paraguay Lowlands, the Eastern Highlands, and the Chaco. While the Paraguay River separates the Paraguay Lowlands from the Chaco, the Highlands are separated from the Lowlands by a great scarp which trends roughly north-south and runs roughly parallel with the Paraguay River. To the east of this scarp lie the uplands, 1000–2000 ft in elevation, more or less completely forested;

west of the scarp are flat plains with gently rolling hills covered with savanna.

Paraguay contains part of the courses of the Paraná (known in Paraguay as the Alto Paraná), the Paraguay, and the Pilcomayo—all major rivers which join up to form part of the La Plata river system. The territories adjacent to these main streams all suffer from flooding, while the land lying between the lower Paraguay River and the Alto Paraná contains extensive areas of marsh. One of these marshes, the Neembucu, meaning "endless," is drained by Lake Ypoa, 100 square miles in area, which lies to the south-east of Asunción. The level plains of the Chaco are often inundated during the rainy season, and the Pilcomayo, which at this time frequently overflows its banks, produces wide areas of marshland. Yet this same river, six months later, is liable to be reduced to the merest trickle.

Located between 20 and 27 degrees S. latitude, Paraguay has a sub-tropical climate, with humid sub-tropical conditions in the east and dry tropical savanna conditions in the west. While climatic conditions in the Chaco are rather inhospitable, elsewhere they are not unpleasant. A fairly well-marked difference occurs between summer and winter conditions. The summer (December to February) is hot, with mean temperatures around 80° F (27° C), although temperatures of over 100° F are fairly common. In winter the temperature ranges between 41° and 68° F (5° and 20° C), the mean being about 65° F (18° C). Nights may be cold occasionally, but temperatures below freezing point are rare. Except in parts of the Chaco, no month is without rainfall. December and March are usually the months of heaviest rains, although March to May is the rainiest season. The average rainfall at Asunción is 62 in.: eastwards it becomes wetter, especially on the plateau, where there are comparatively heavy rains which reach 80 in. in the Brazilian frontier zone; westwards the country becomes progressively drier. Rainfall and rivers between them largely account for the variations in the natural vegetation which include tracts of dense forest, widespread marshlands, extensive areas of savanna, and regions of dry thorn scrub.

THE PEOPLE

The total population, slightly over 2 millions, is small for the size of the country. We have already noted one important reason which helps to explain this fact.

The great majority of the Paraguayan people are of mixed Indian and Spanish stock, with the original Guarani Indian influence preponderating. The proportion of Spanish blood in the Paraguayan population is slight—smaller than in most of the countries which were formerly part of the Spanish Colonial Empire. On the other hand, the number of pure-blooded Indians is also small: estimates vary, but the number is probably around 50,000; most of them live in the Chaco.

The remainder of the population, totalling no more than 1 or 2%, is descended from either early Spanish families or from more recent Euro-

pean immigrants, such as Portuguese, Italians, Germans, Czechs, and Russians, together with a few Argentinians. Together, they form a small but influential group and constitute the politically and economically responsible element in the republic.

An interesting group are the Mennonites, pacifist Christians of German ancestry who were granted asylum in Paraguay and who have formed a number of settlements. The Mennonites set up colonies in the Chaco, the most important being at Filadelfia, where they have continued to live, unmolested and exempted from military service, their own way of life according to their religious beliefs. In this harsh and inhospitable environment they have managed, by dint of hard labour and unremitting toil and a constant battle against drought and insect pests, to develop the land and secure some prosperity by cultivating cotton and fruit and raising cattle.

The population is unevenly spread. The great bulk of the population lives to the east of the Paraguay River, while most of these are concentrated in the southern part of the Paraguay Lowlands. The northern part of the Lowlands, the Chaco plains, and the Eastern Highlands are very thinly peopled. Population density is nowhere very high: in eastern Paraguay it is about 22 to the square mile; in the Chaco less than 2.

The Paraguayans are bilingual, Spanish and Guarani being spoken. But outside the capital, where Spanish is the official language, the people generally prefer to speak the native Guarani tongue. The illiteracy rate among the Paraguayans is still very high, although primary education is now free and compulsory. Roman Catholicism is the state religion.

THE ECONOMY

Authorities differ over land use: the *Oxford Economic Atlas*, for instance, classes 75% of the total area as waste and built-up land. Much of the Chaco, it is true, is difficult to classify, being neither woodland, true savanna, nor desert. In the following figures probably much of the area classed as forest and grassland is of a poor degenerate kind which would not normally be so described.

| | | | | % |
|-----------------|---|---|---|----|
| Forest | . | . | . | 46 |
| Pasture | . | . | . | 50 |
| Cultivable land | . | . | . | 4 |

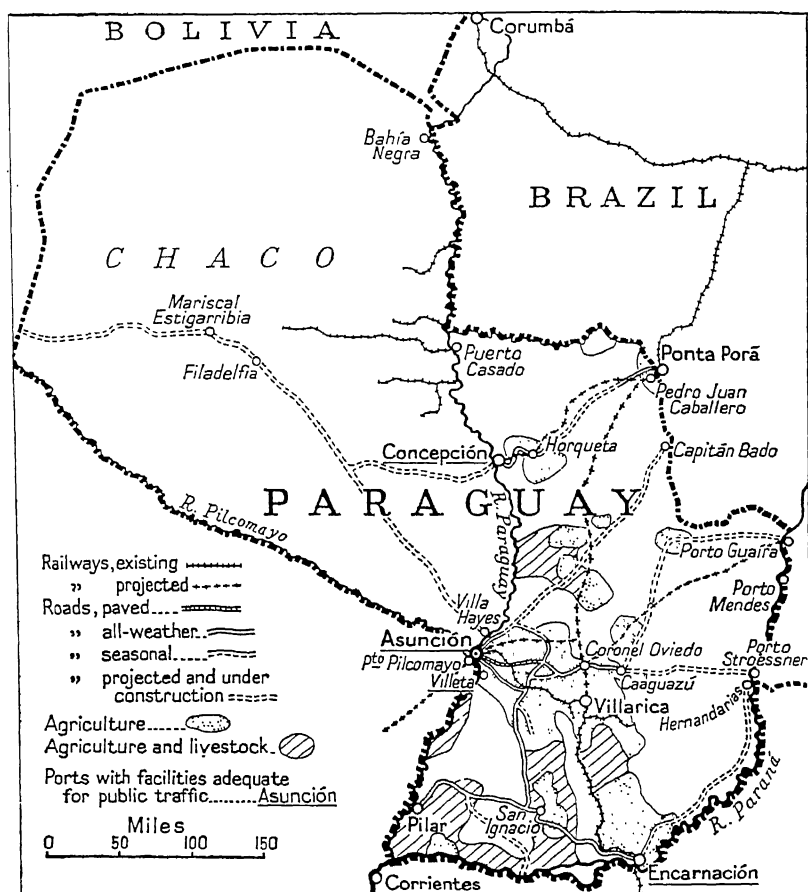
Although 4% is classed as cultivable land, slightly less than 1% is actually under cultivation.

The vast majority of the working population gain their livelihood from the land, chiefly by cultivating crops or raising cattle. Industrial activity is slight, being almost completely confined to the processing of foodstuffs and forest products. The Paraguayan economy centres upon crop cultivation, pastoral farming, and the exploitation of forest resources, none of which is highly developed.

There is little agriculture: even so, it is the most important occupation. Except in the vicinity of Asunción, cultivation is confined to small areas,

usually of cleared forest land, where the soils are reasonably fertile. Agriculture is still primitive for the most part; output per worker and per unit area of land remains low in spite of a programme of agricultural education launched in 1942. A large proportion of the people live by a semi-subsistence economy, cultivating manioc, maize, beans, vegetables, and sweet potatoes, and sometimes cotton and tobacco on their small plots. A considerable percentage of the peasantry is landless, although there is, in fact, no shortage of land.

Paraguay is practically self-sufficient in foodstuffs, although she imports some 60,000 tons of wheat a year. Wheat is a new crop to Paraguay. She grows enough manioc (about 1 million tons annually), which is the staple foodstuff, sufficient maize and beans, other important dietary items, and slightly more than enough rice and sugar. About 25,000 acres are planted to sugar-cane, principally for the making of *cana*, a spirit akin to rum;



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FIG. 123.—Paraguay: general features.

recently, however, sugar-refining has been introduced, and now between 25,000 and 30,000 tons of refined sugar are being produced annually, enough to satisfy the home market. Fruits, especially citrus fruits, grow exceedingly well, and there is an abundant supply; small quantities, mainly tangerines and grapefruits, are exported. From the leaves of the bitter orange tree an essential oil, known as petit grain, is produced for export: it is used as a basis for perfumes and flavourings. Cotton already grown in limited amounts, has possibilities, since its long-stapled fibre is already of high repute. Cotton yields well, but largely on account of its unscientific cultivation suffers much from insect pests. About 175,000 acres yields roughly 10,000 metric tons a year.

Stock-raising has long been one of the major activities, and Paraguay has about $5\frac{1}{2}$ million head of cattle. Although cattle-rearing is widespread, the most important cattle areas are in the north beyond Concepción and in the south in Misiones, the triangular territory embraced by the Rivers Paraguay and Alto Paraná. There are three meat-packing plants, established by Argentinian and Uruguayan companies, and meat exports are important, accounting for nearly a quarter by value of the export trade. The preparation and export of hides is a significant subsidiary of the livestock industry, although output has declined. Paraguay also has a quarter of a million sheep and approximately the same number of pigs.

Forest products account for over 50% of the exports: the chief items are timber, quebracho extract, and yerba maté. Paraguay's timber resources are extensive and could be more profitably exploited, although the transportation problem is a formidable handicap to any such increased development. Despite the difficulties, timber ranks as the major export item. The other two forest products are of considerable interest. Quebracho extract, derived from the quebracho tree, is used in the tanning of leather. Yerba maté is a kind of "tea" made by infusing the leaves of a species of holly. About 14,000 tons of Paraguayan tea are produced each year, some of it being consumed in Paraguay, but much being exported to the near by South American countries, especially Argentina. The gathering, preparing, and exporting of yerba maté is an important industry, and for long has meant much to the country's economy.

Paraguay's mineral wealth is a matter of uncertainty. Rich iron ores are known to exist—those at Ibicui were worked as early as 1863—but are not worked to any extent. Manganese-ore deposits, estimated at 60 million tons, occur at Ibicui and Quiquio, while copper has been located at Quiquio, Concepción, and San Miguel. At the present time limestone is virtually the only mineral produced: it is needed for the making of cement. There are no deposits of coal nor, so far as is known, of oil, although exploration of the Chaco region is proceeding, particularly in Olimpia province. Paraguay's water-power potential is considerable, estimated at 2,800,000 h.p., but very little hydro-electric power is produced.

The few industries that exist are based mainly upon agricultural, pastoral, and forest products, *e.g.* saw-milling, sugar-refining, quebracho

extraction, and meat-packing. Apart from the few industries processing commodities for export, industries are concerned with the production of goods for local consumption. There are one or two small textile factories producing cotton and rayon fabrics, a cement plant, rum and alcohol plants, and a number of factories making footwear, furniture, cigars, soft drinks, soap, and matches.

Paraguay's trade is small. Exports have already been noted; the chief imports consist of foodstuffs, textiles, chemicals, vehicles, and machinery. There is a favourable balance of trade. The United States takes about a quarter of Paraguayan exports: she is also the major supplier of imports. In 1953 Paraguay joined the Treaty of Economic Union with Argentina and Chile.

COMMUNICATIONS

Increased exploitation of Paraguay's resources as well as overall economic development is basically dependent upon the provision of an adequate transportation and communications network. The opening up and settlement of the more remote parts of the country as well as easier and increased links with overseas markets are bound up with improved communications facilities, and until such are forthcoming there will be little pioneer settlement, little filling up of the empty spaces, while general economic development will be seriously hindered. At present Paraguay's communications are poor, often primitive, and very limited. However, there are plans for the expansion of transport facilities and the creation of a skeleton network.

Partly because of the lack of railways and motor roads and partly because of the great rivers which conveniently flow in the right direction, much of Paraguay's internal traffic and the great bulk of the foreign trade is water-borne. Approximately three-quarters of the trade is to and from Asunción, which is not only the largest town in the most densely peopled part of the republic but also the dominant commercial centre. Altogether there are 1865 miles of navigable waterways within the country. The Paraguay River itself is navigable throughout Paraguay and as far upstream as Corumbá in Brazil. There is an average draught of 10 ft for approximately three-quarters of the year as far as Asunción. The Alto Paraná is beset with difficult shallows at the Arapeí Rapids, and between Corrientes and Encarnación there is a depth of not more than 6 ft. Beyond Encarnación there is a navigable waterway for close on 500 miles to Porto Mendes, after which navigation is blocked by the Guaíra Falls lying on the Paraguayan frontier. This obstacle is skirted, on the Brazilian side, by a short stretch of railway. Since both the Paraguay and the Alto Paraná are in their natural state and unimproved, navigation is handicapped by the winding courses, shallows, shifting sandbanks, and low-water periods.

Apart from one small stretch of line and a number of privately-owned lines, Paraguay has only one main railway: this is the British-owned Cen-

tral Railway, which runs from Asunción to Encarnación, a distance of 274 miles. A river train ferry provides a link with Posadas in Argentina, which is the terminus of the railway from Buenos Aires. From the Paraguayan Central Railway a branch line runs from near Villarrica to Abai. A 35-mile metre-gauge railway, El Ferrocarril del Norte, runs eastwards from Concepción to Horqueta. Five privately-owned lines run westwards into the Chaco to provide transport for the timber, quebracho, and sugar which are produced and shipped from the small riverside ports of Puerto Guarani, Puerto Palma Chica, Puerto Sastre, Puerto Casado, and Puerto Pinasco.

Paraguay has an ambitious plan of railway development, mainly designed at opening up and developing the north-eastern part of the country and providing links with Brazil. One project envisages two lines diverging from Coronel Oviedo, one running northwards to Pedro Juan Caballero, the other north-eastwards to Porto Guairá, both towns on the Brazilian boundary. The former line would have more than merely local significance, since it would provide a route from the Brazilian railhead at Ponta Pora through southern Brazil to the Atlantic coast. A second project is to continue the Concepción-Harqueta railway forward across the plateau to Pedro Juan Caballero. Yet another plan is to extend the line from Abai north-eastwards to the Brazilian frontier opposite Foz do Iguaçu.

The existing road system of Paraguay is very poorly developed and altogether inadequate for the country's needs, limited as they are at present. There are only some 60 miles of paved highway and 620 miles of gravel or beaten earth roads; elsewhere the roads are merely bullock tracks. As with railways, however, a projected highway system has been blueprinted, and parts of it are already under construction. The plan provides for seven main routes in eastern Paraguay. The first, an all-weather road, already runs from Asunción southwards and eastwards to Encarnación. The second, also an all-weather road which is metalled part of the way, runs eastwards from the capital to Caaguazu via Coronel Oviedo: from Caaguazu the road is to be extended to Presidente Stroessner on the Paraná, and ultimately, by using the Brazilian arterial road, will provide a through route to the Brazilian port of Paranagua. The third highway, still on paper, is planned to run from Caaguazu northwards and then eastwards to the Paraná opposite Porto Guairá. The fourth route is to go north-eastwards from Asunción to Capitan Bado on the Brazilian frontier. Although a short stretch of this highway already runs from the capital, no further building is as yet in progress. Fifth in the series is a fairly good all-weather road linking Pilar on the Paraguay to San Ignacio, at which point it joins the Asunción to Encarnación road. A sixth route runs north-eastwards to Horqueta, whence a projected extension is to run across the plateau to the frontier town of Pedro Juan Caballero. Finally, a road is planned to run to the remote trading post of Hernandarias. Western Paraguay is almost completely devoid of roads. A highway across the Chaco is projected which is to run from Villa Hayes, a few

miles upstream from Asunción, north-westwards to the Mennonite settlement of Filadelfia and thence westwards to the Bolivian frontier. Work on this project has begun, and the first 280 miles are now open to traffic.

LAND TENURE *

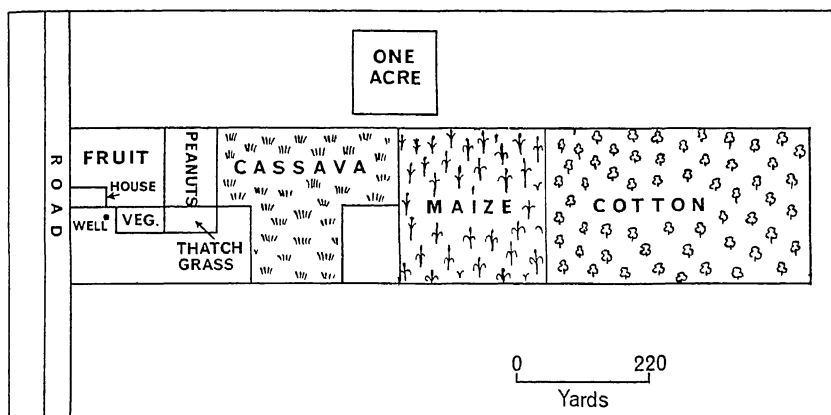
The character of the agrarian structure has important effects upon the technical and economic condition and development of agriculture. Paraguay is agriculturally backward and one of the poorest of Latin American countries, as we have already noted. A root cause of this state of affairs lies in the existing system of land tenure. In an effort to develop the national economy a land reform programme is now being carried out. The nature of the problem facing the national government is clearly manifest in the following statistics. Of the total land properties in Paraguay, some 125,000, the greater bulk are in the possession of a few people. For example, in the Chaco 14 landowners hold a total of 7,570,000 hectares between them and a further 327 own 8,720,000 hectares; thus 341 people possess more than 16 million hectares out of the 22 million hectares of the region. Large holdings, however, are to be expected in the Chaco, but the situation is not so very much different in eastern Paraguay, where 11 proprietors own 5,550,000 hectares and 1200 hold 9,960,000 hectares. A mere 530,000 hectares remain to be shared by all the other landowners in eastern Paraguay. This situation has resulted in the fragmentation of small properties, a process which has merely aggravated conditions, and a large number of small farmers have to subsist upon $\frac{1}{2}$ hectare of land.

A land reform law was passed in 1940—the Estatuto Agrario de 1940—but proved rather ineffectual. Land reform entails the taking over (sometimes by compulsion if voluntary relinquishment is not forthcoming) of large properties, the splitting up of such properties, and the re-allocation of such land to the small-holders and the dispossessed peasantry. This is a difficult and complicated procedure, and can be carried out peaceably only in a climate of enlightened public opinion. To help them in this major undertaking, which might feasibly have untoward political repercussions, the Paraguayan Government sought the help of the Food and Agricultural Organisation (F.A.O.) of the United Nations. F.A.O. has given much valuable advice and assistance, and currently the entire problem of agrarian reform in Paraguay is being reconsidered. A National Commission for agrarian reform, with the Minister of Agriculture as chairman, has been established to promote co-ordination, particularly in land settlement, the extension of agriculture, training in land husbandry, and the provision of credit. In addition, a Department of Rural Welfare has been set up to nurse community development projects and to foster co-operation in relation to land settlement. When Paraguay has implemented this land reform programme an important contribution to the country's economic development will have been made; in addition, it will mitigate the poverty which at present prevails among the rural population generally.

* Based on F.A.O. information.

A Paraguayan Farm. Let us look for a moment at a fairly typical farm in the Paraguayan Lowlands. This account is based on Professor R. S. Platt's field study of Vera Farm in the Isatu District 15 miles south-east of Asunción.*

The farm, situated on the undulating plain, is elongated in plan, approximately 110 yards wide and 650 yards long, with an acreage of about 15. The plot supports the farmer, his wife, and seven children. Around the house with its well are garden patches, where several fruit trees grow, producing oranges, peaches, avocado pears, papayas, etc., together with vegetables, beans, peppers, and peanuts. These garden patches take up about 2 acres of land. A further 2 acres are under grass, and the grass plus



[After Platt.]

FIG. 124.—Plan of Vera Farm, Paraguay.

other feedstuff garnered from the fields supports seven cows, three donkeys, and some poultry. About 5 acres are devoted to subsistence crops, usually maize and manioc, which roughly share the acreage. Thus approximately two-thirds of the land is given over to producing food crops and rearing animals which augment the food supply.

The remaining third is devoted to a cash crop—cotton. (On some farms the growing of sugar-cane provides an alternative money crop.) In a large field of 5 acres the cotton is planted in September and harvested seven months later in April, early autumn. From this land the farmer gets a yield of approximately 2 tons of cotton, which he picks, cleans, and bags by hand and carts away to the ginnery. The money he receives for his cotton crop is, usually, the only cash he earns, and this must cover the cost of any food, clothes, implements, or household requirements that he needs and does not produce or make himself.

Since the cash crop is of such importance to the farmer, it has prior claim on his attention. He follows no regular system of crop rotation, however, and plants the same field to cotton maybe for several years

* *Latin America*. New York: McGraw Hill. 1942.

running, only planting on fresh land when the cotton crop shows signs of declining yield or inferior quality.

Summing up, farming is small-scale, unscientific, and subsistence in type, except for the production of a cash crop of limited value. Small farming of this type is the leading interest in the core area of Paraguay.

PARAGUAY: REGIONS

THE PARAGUAY LOWLANDS

The Paraguay Lowlands, which form the geographical, if not the geometrical, core of the republic comprise the flood-plains areas of the lower Alto Paraná and middle Paraguay, together with stretches of undulating country where series of low hills rise up above the level of the flood plain. Floored in the main by recent alluvium, but with fertile clays capping the rounded crystalline hills, the region has naturally rich soils. Unfortunately, however, large areas are prone to flooding during the rainy season, when the rivers break through their natural levees and inundate the countryside, producing wide stretches of marsh. Some of these marshlands dry out during the drier season, although the large lagoon of Lake Ypoa is surrounded by extensive marshes which never properly drain out. The Paraguay Lowlands are covered with savanna—wet savanna or rank, thick grasses in the marshy areas and grass with trees or parkland on the hills. Palm trees, occurring spasmodically or in clumps, are conspicuous and characteristic features of the landscape.

The Paraguay Lowlands are agriculturally the most important in the country: here is most of the cropland and here are most of the cattle. The chief cropping area lies immediately to the east and south-east of Asunción, though there are smaller areas around San Ignacio and Encarnación in the south. A wide variety of crops—cereals, pulses, roots, and tree-crops—are cultivated. Agriculture is of the semi-subsistence type; the only cash crops of any significance are cotton, tobacco, and sugar-cane. Small-scale farming is characteristic of much of the area. Formerly, farming was entirely of the subsistence kind, but latterly, partly as a result of official encouragement, some commercial crop growing is undertaken. There is every likelihood that such commercialisation will increase. Cattle-breeding has been a basic activity since the days of earliest settlement, and there are large herds in Misiones.

Approximately 90% of the total population of Paraguay live in this region. Urban centres are few, and the population is predominantly rural, with many of the people living in villages. Asunción (281,000) is the only large town in Paraguay. The capital, together with its suburbs and district inhabitants, accounts for about a quarter of the republic's total population. Asunción is situated on the left bank of the Río Paraguay, where the river has eroded an embayment and where a low hill provided an elevated site against flooding. The oldest part of the city lies near the river; the newer portion has spread inland into the hilly country. Asun-

ción has little to commend it; it still has no sewage-disposal system, and a piped water supply is only now being installed. A few miles north-east of the capital is Luque (25,000), really a suburb of Asunción. Immediately to the south and south-east of Asunción are, respectively, the small townships of Villeta and Yaguarón, the first the centre of a cotton- and tobacco-growing area, the second the centre of an orange-growing district which produces most of Paraguay's petit-grain. Just over a hundred miles from the capital and situated on the Central Railway is Villarrica (26,000), a market town collecting cotton, tobacco, sugar, hides, and yerba maté, and also the wine which is produced by the German settlers who live in the area. At the terminus of the railway is Encarnación (40,000), the second largest town in Paraguay, and a busy port on the Alto Paraná; it lies opposite Posadas in Argentina, with which it has a train-ferry connection. Encarnación exports the products, chiefly timber, maté, cotton, tobacco, and hides, of its rich hinterland. A modern town, Encarnación shows promise of fairly rapid growth.

THE EASTERN HIGHLANDS

From the structural and geological point of view the Eastern Highlands are merely an extension of the Paraná Plateau of southern Brazil. The great laval sheet has been well dissected to produce a topography of low mountains and hill ranges. The plateau has an elevation of between 1000 and 2000 ft. Its western edge is sharply defined by a steep scarp which is cliff-like in character. The Río Paraná, which runs southwards and then south-westwards across the plateau, has incised a deep, canyon-like valley in the plateau. At the point where the river cuts the northern boundary of Paraguay occur the Guaira or Sete Quedas Falls. The Alto Paraná delimits Paraguay's eastern and southern boundary, which marches alongside Brazil and Argentina.

The plateau experiences fairly heavy rainfall, and as a consequence is almost completely forest covered. The forest contains a great variety of species of hardwood and offers an untouched reserve of valuable cabinet woods. Devoid of railways and with few highways, the forest has handicapped settlement, and the region remains sparsely populated. Only more and better communications can break the isolation of this wild, forested hill country.

The lowlands to the east of the Río Paraguay as far as the scarp of the plateau are, from the physical point of view, obviously not part of the highlands, but, for convenience, may be taken as forming part of the region. This plain, though flat in parts, is diversified by rolling hills which are well wooded. Most of the settlements in fact lie outside the highlands proper. Away from the riverside, settlements are very dispersed, the people living by subsistence farming in forest clearings.

Timber, yerba maté, and oil of petit-grain are the chief commercial products of the region. The maté tree (*ilex paraguayensis*) grows wild in the forests of the plateau, and the gathering of the leaves is an important

activity. Some yerba maté is cultivated in plantations. The process of drying is done either over open fires or in brick ovens. When dried the leaves are ground and packaged ready for export. A recent development is the cultivation of coffee. In the province of Amambay, American and Brazilian firms have acquired 740,000 acres, of which some 14,000 acres have already been planted. The coffee trees bore their first fruit in 1959 and in 1962 5,300 metric tons of coffee were produced. The northern provinces of Amambay and Concepción are notable cattle areas; between them they support some 375,000 head.

In the more favoured and more accessible areas small-scale colonisation has taken place, the colonists supporting themselves by growing sugarcane, tobacco, manioc, and rice. One of the most promising farming areas is the country lying between Coronel Oviedo and Presidente Stroessner, and the *Instituto de Reforma Agraria* has drawn up plans to colonise and develop it.

Concepción (32,500), located on the east bank of the Río Paraguay some 130 miles north of Asunción, is the chief commercial centre of the north. The river port has considerable trade with Brazil and is a free port for that country. From Concepción a 35-mile stretch of railway runs to Horqueta (25,000) a cattle and lumber town. Also from Concepción runs a highway which traverses the plateau to the border town of Pedro Juan Caballero, the centre for the coffee-growing district. The river town of Presidente Stroessner is named after the present President of Paraguay.

THE CHACO

The Chaco region, which covers an area of some 95,000 square miles, is part of the Gran Chaco, an extensive plain covered with scrub forest over much of its great extent, lying between the Andes and the Paraguay River and shared by Bolivia, Brazil, Argentina, and Paraguay.

The Paraguayan Chaco lies west of the Río Paraguay. It is a flat, featureless plain built up of great thicknesses of silt carried down from the Andes by numerous streams. In summer temperatures are high and there are heavy rains, which result in the flooding of extensive areas. During the cooler winter season there is drought; the land dries out, becomes parched and baked, and the streams, which a few months before were brimming over their poorly defined channels, are reduced to mere trickles, sometimes drying up completely to form salt marshes. Generally speaking, the Chaco becomes drier westwards, and parts of the north-west are almost waterless. This decrease in rainfall is reflected in the vegetational cover of the Chaco. Near the Río Paraguay there is considerable forest cover, with grassy areas and clumps of palms; farther westwards scrub-forest prevails, with acacias, mimosas, and palms broken by patches of rough savanna; in the far west the scrub-forest degenerates and thorny thickets occur among the coarse grassland.

The Chaco is a zoological sanctuary, and innumerable species of animals, reptiles, birds, and insects haunt the land. Jaguars, armadillos, alliga-

tors, monkeys, snakes, toads, rheas, storks, parrots, ducks, bats, and butterflies, as well as swarms of insect pests, such as ants and locusts, inhabit the area. The Chaco is not an attractive environment in its raw state, and it is not surprising that it is sparsely populated. Most of the inhabitants are Indians, whose numbers are not known precisely but are estimated at about 40,000. During the last few decades the life of the Chaco Indian has undergone much change. In some areas game, upon which the natives mainly depended, has become scarce, and some of the nomadic Indians have been compelled through sheer necessity to become cultivators. Others, especially those dwelling along the Río Pilcomayo, have become herders rearing cattle, horses, mules, sheep, and goats. During the Chaco War with Bolivia (1932-35) many of the Indian tribes were dispersed and considerable numbers of Indians killed. Since the end of the war many of the Chaco Indians have forsaken their old way of life and drifted to the estancias which have been developed in the south-west, where they have found work as cowboys or labourers.

Apart from the Indians there are few other people in the Chaco. Perhaps the most numerous as well as the most interesting are the Mennonites, already mentioned. Filadelfia in the heart of the Chaco is the most important Mennonite colony. Hard-working, peaceable individualists, the colonists have managed to secure a livelihood for themselves by cultivating crops and raising cattle in spite of the difficulties and hardships of life in the Chaco.

North of Concepción is a series of small riverside settlements on the banks of the Río Paraguay. From them narrow-gauge railways run westwards into the Chaco to the areas where the quebracho tree grows. The quebracho, which grows up to a height of about 75 ft, produces tannin used in the tanning of leather. It is a slow-growing tree needing a hundred or more years to reach maturity. The trees are felled and dragged by oxen or machine to depots where the extremely hard, heavy wood is broken up and shredded by machinery and then boiled in water to release the tannin. The red-brown juice is drawn off from the vats and, being gluey in consistency, congeals into a hard mass on cooling. The solidified tannin is then sacked and shipped downstream in lighters or river-steamers for export. The quebracho industry, formerly one of the chief economic mainstays of Paraguay, is declining, and mainly for three reasons: first, the tree occurs scattered throughout the scrub-forest, and as a result of intensive felling during the past hundred years local supplies are becoming exhausted and the search for the tree is having to be carried farther and farther inland; secondly, the use of new tanning materials and more modern methods of curing hides have led to a gradual reduction in the demand for quebracho extract; and, thirdly, the increasing use of plastics and other substitute materials for leather has led to a decline in the demand for tanning materials. George Pendle has described the quebracho camps and the attendant developments as follows: "A great deal of money has been spent in setting up homes, hospitals, and recreation rooms for the

men who work in the remote Chaco camps, and their families. These people are of many races: Guarani-speaking Paraguayans, Spanish-speaking Argentines, Germans, Italians, and some Russians. As the forest is cleared the open ground is stocked with cattle. Thus, with the passage of time, the quebracho companies have become the proprietors not only of steamers, lighters, ports, factories, and railways, but of whole villages, extensive pasture-lands, and huge herds of cattle."*

At present the Chaco is a region of limited usefulness, but it may yet prove to have hidden riches. It is thought that petroleum may be present, and the Government is exploring the Chaco, especially the north-eastern portion. Oil occurs near by in Bolivia and, indeed, Paraguay has signed an agreement with Bolivia for two oil pipelines across the Paraguayan Chaco.

PARAGUAY'S FUTURE

Paradoxically, Paraguay is poor and very much underdeveloped in spite of its rich potentialities of soils and forest wealth and its, on the whole, agreeable climate. Certain causes which go far to explaining this state of affairs have been noted—autocratic rule, exhausting wars, interior location, and relative isolation. What of the future? What prospects lie ahead? Is Paraguay doomed to remain the backward boy in a class of lusty growing youths?

Progress is linked up, perhaps first and foremost, with communications. The isolation of Paraguay—the key factor in its past—must be broken. The plans on foot, if fully implemented, will do much to break down the country's isolation. Until a transport network is provided which will not only allow the frontier of settlement to advance and new territory to be opened up but which will also facilitate links with overseas markets, the economy will continue to be gravely hampered.

At present the national income per capita is low and the per capita output low. So long as agriculture—the chief basis of the national economy—is mainly of a subsistence or semi-subsistence type this condition will remain. But, as we have seen, land reform, agricultural education, land colonisation, and cash crops are gradually being introduced. These measures should bring their rewards. Assuredly Paraguay has ample scope for the development of agriculture, for she possesses rich farming lands and a favourable climate.

The future of her forest and mineral resources is not easy to assess, but probably much more effective exploitation of them could be made. The abundant water-power resources could be harnessed to supply Paraguay with adequate power. Capital, however, is required for such development, and the Government will be compelled to lean heavily on outside sources for this. A rich oil strike would greatly help Paraguay. Even so, on the basis of present known resources, Paraguay could support several million people at a reasonable standard of living.

* *South America*. Oxford University Press. 1958. P. 57.

CHILE

The Republic of Chile, which extends along the whole of the Pacific coast of South America from the parallel of 18 degrees S. to the extremity of the continent, is 2800 miles long and varies in width from 40 to 200 miles. It has an area of 286,397 square miles and an estimated population of 8,567,000. Territorially Chile is essentially the land between the crest of the Andes and the Pacific. Chile's long frontier with Argentina coincides, for the greater part of its length, with the watershed of the Andes, which shuts off and isolates Chile from the rest of the continent. Chile's elongated form brings to the country advantages and disadvantages: its extension from tropical to tundra conditions, plus the wide altitudinal range which exists in the country, gives Chile almost every variety of climate and vegetation and soil; on the other hand, the peculiarity of its geographical shape presents problems of national unity, for the extremities of the state are far removed from the nuclear area.

PHYSICAL FEATURES

Chile occupies the long thin strip of territory between the Andes and the sea. The Andes, which bound Chile on the east, rise to a general elevation of 5000-15,000 ft, although numerous summits, nineteen in point of fact, reach over 20,000 ft. Surmounting the young fold mountains of the Andean Cordillera are many volcanoes. In southern Chile the Andes, though lower than further north, are far enough from the equator to be perpetually covered in ice and snow, and the valleys to be filled with glaciers which grind their way down to the coast. Running parallel with the Andes, from the Peruvian frontier to the island of Chiloé, is the Cordillera de la Costa or Coast Range, which reaches heights of 6000-7000 ft. In the southern part of Chile this range ceases as a continuous chain, but the structural line is continued as a maze of islands, indicating that subsidence has occurred. Between the Coast Range and the Andes is a down-faulted depression which is masked in the north, but stretches as a great longitudinal valley between Santiago and Puerto Montt, and is continued southwards as the sea channel between the island fringe and the mainland. North of parallel 33 degrees S., transverse ridges across the country not only eliminate the longitudinal interior valley but also impede communications equatorwards.

Northern Chile, from Arica to Copiapó, 27 degrees S., is completely rainless and utterly arid. This tract forms the barren Atacama Desert. It is a land of torrid heat, merciless sunshine, and bare, forbidding mountains. Farther south, roughly as far as 33 degrees S., conditions are semi-arid. Rainfall, up to about 10 in., may fall, but precipitation is very variable and is also likely to be torrential in its nature and to cause floods. Both here and farther north many streams flow down from the Andes in narrow valleys, but a large number, especially in the true desert, never

reach the sea. From the 33rd to the 37th parallel a distinct seasonal regime of winter rainfall and summer drought occurs: this is the zone in which the Mediterranean type of climate and vegetation is found. South of approximately 37 degrees the country lies in the belt of the westerly winds all the year round. The climate is of the west-coast marine type, which is characteristically cool and moist. The prevailing westerlies, which are compelled to rise over the southern Andes, produce heavy orographic rainfall, and the more southerly part of the country is drenched with perpetual rains. South of the Peninsula de Taitao the land suffers an excess of rainfall and the climate is cold and stormy. At the extreme southern tip of Chile lies the bleak, windswept almost antarctic island of Tierra del Fuego, the western two-thirds of which forms Chilean territory.

THE PEOPLE

Prior to the Spanish conquest Chile was occupied, and according to archaeological evidence had long been occupied, by native Indian populations. Numerically they were small. The Indians of northern and central Chile came under Inca hegemony, and thus differed markedly in culture from those who dwelt in the forest lands of the south. When the early Spanish explorers began to push southwards into Chile they came into contact with the Indian tribes, who put up a stubborn resistance. The Indians were in fact never conquered but retreated southwards into the forest environment, where they found a safe refuge. To this day 95% of the pure-blooded Indians of Chile are to be found in the area between the Bío-Bío and Tolten rivers. These Araucanian Indians number around 100,000. The more primitive Indians of the archipelago never numbered more than a few thousand all told, and are now virtually extinct.

On to the basic substratum of Indian blood was grafted that of the Spaniard. The Spanish settlers intermarried freely with Araucanian women, and the offspring from these mixed marriages produced the Chilean mestizos, who are the predominant group in present-day Chile. The bulk of the people bear distinct traces in their features of their Araucanian ancestry. From the ethnic point of view the Chileans form a fairly homogeneous group. The only other element entering into the composition of the population is the European element; the European immigrants, who have come during the last hundred years are chiefly German, British, French, Swiss, Italian, and Yugoslavs. Of these national elements, the Germans are the most conspicuous. It is worth noting that the influence which these European immigrants have had upon Chilean life and development has been altogether out of proportion to their actual numbers. Summarising, it may be said that four racial groups are clearly discernible: (1) the indigenous Indians, who live mostly in the south; (2) the people of more or less pure Spanish descent, who form the upper class; (3) the mixed Spanish-Indians, who form the mass of the population; and (4) the European immigrants, who predominate in the middle class.

The population is estimated (1966) at 8,567,000. Some 90% live in central Chile, where they are concentrated more particularly in the Mediterranean region. Northwards and southwards the population rapidly thins out and tends to occur in scattered pockets.

NATURAL RESOURCES

Chile is fairly liberally endowed with natural resources, and in this respect is much more fortunate than her neighbours. The fundamental natural bases—minerals, power supplies, good soils, water supplies, forest resources—necessary for a well-founded and prosperous economy are there. While the extremities of the country suffer climatic extremes, about 40% of the total area of Chile enjoys very favourable conditions.

Chile's mineral wealth is considerable: she possesses large deposits of nitrate, copper, iron, and manganese, and smaller, but still valuable, deposits of precious metals and certain non-metallic minerals, such as calcium borate, sodium chloride, sulphur, and asbestos. For a long time Chile's economic existence has been very largely dependent upon the exploitation of her nitrate and copper resources. Chile is, indeed, the chief mining country in South America, producing about a half of the entire continental output, in terms of value, of minerals and metals. Chile has small deposits of coal, some oil, and rich water-power resources.

Soils vary considerably, but deep loams, fertile and highly productive, occur in the central valley. Good soils are also found in the semi-arid zone, but are handicapped by insufficient rainfall. The soils which have developed under the cool temperate conditions of southern Chile and under forest conditions are podsollic. There is no shortage of good arable

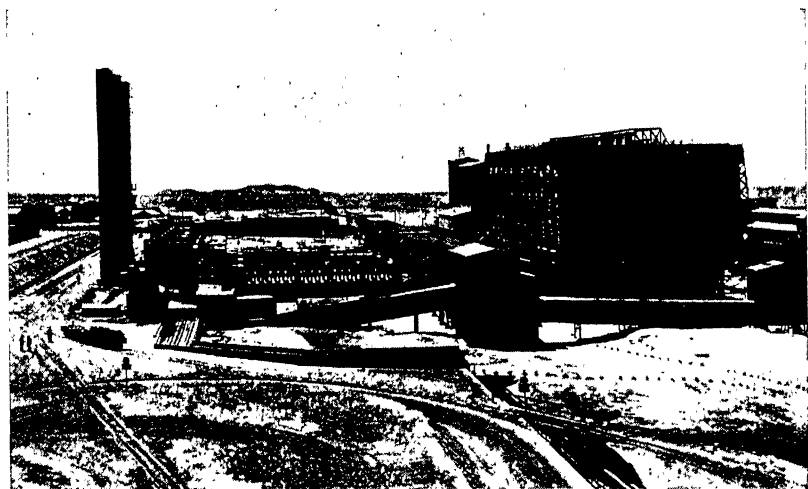


FIG. 125.—Nitrate granulation plant. An oficina in the arid Atacama Desert where the caliche is crushed, dissolved in water, and the solution then evaporated to allow the nitrates to crystallise out.

land when viewed in relation to the population and its food requirements.

Considerable areas of southern Chile are forested. The true forest-covered region extends between latitudes 37 and 44 degrees S. and covers an area of some 60,000 square miles or 22% of the total area of the country. But in spite of this extensive coverage, Chile's resources of utilisable timber have probably been grossly over-rated. The inaccessibility of many of the forested areas and the poor quality of some of the timber are factors which have not, perhaps, been adequately appreciated. So far such exploitation as has been undertaken has been unscientific, and there has been no real policy of forest conservation. However, allowing for all this, it remains fundamentally true that Chile possesses large and important forest resources.

Despite the valuable fisheries which occur off her long coast, Chile has done little until recent times to harvest the riches of the sea. There are excellent opportunities for a greatly enlarged fishing industry.

Water, all too often, is taken for granted, but it is a resource of tremendous and growing significance. The Andean rivers, fed by melting snows, provide invaluable supplies of water, not merely for power generation but for Chilean agriculture, which, to a very considerable extent, is dependent upon irrigation.

Finally, Chile possesses magnificent scenery, an important potential asset. The attractive, warm, sunny climate of the Mediterranean zone, the spectacular mountains, the glacier-fringed fiord coast of the south, the vast forests, the swift rivers, the beautiful lakes, etc., offer possibilities for the development of a tourist trade.

THE ECONOMY

Land utilisation is approximately as follows: 60% mountainous and waste land, 23% forest and woodland, 9% permanent pasture and meadow land, and 8% arable and orchard country. Although the amount of cultivable land is relatively small, it should be noted that approximately half of this land at any given time is under fallow and that the acreage per head of the population is higher than in many other Latin American countries. Furthermore, there are still some areas under forest which could be cleared for cultivation. Almost the whole of the cultivable land—some 13 million acres—lies in the central section of the country, between Coquimbo and Puerto Montt. Probably slightly less than 4 million acres are actually under cultivation, and 75% of this acreage is irrigated, a considerable proportion of it being put to pastoral use. It is estimated that a further 2 million acres could be irrigated. Most of the arable and pastoral land is held in large estates, and in "Mediterranean" Chile they comprise 89% of the farmed land, yet account for a mere 7% of the total number of holdings. These *haciendas* are worked by peasant labourers, known as *inquilinos*. Usually the *inquilinos* are provided with a dwelling and a plot of land for their own use by the *hacendeiro*. Farther

south, in "forest" Chile, though large estates do exist, there are numerous substantial peasant-owned properties usually worked by European immigrants, notably Germans.

The predominance of large feudal estates, primitive agricultural methods, soil erosion, etc., mean that farming is, by and large, inefficient, and Chile produces only about a third of her total food requirements. The chief crops are maize, fodder crops, and beans, with viticulture near the desert margin and wheat more especially in "forest" Chile. Of lesser importance are rice, barley, oats, tobacco, sunflowers, and hemp. Stock-raising is the most important activity, however, and is the mainstay of the *haciendas*. Chile has about $2\frac{1}{2}$ million head of cattle, half of them being reared in Central Chile, most of the remainder in "forest" Chile, where they form part of the mixed farming system which is typical in this area. In this latter region dairying is beginning to show progress. Nearly 3 million sheep are reared in Central and Northern Chile, but the two southern provinces of Aysen and Magallanes have, between them, 53% of the country's 6 million sheep. Here, in Southern Chile, the sheep are of very high quality and wool and meat are efficiently produced.

Chile has had a remarkable degree of success in establishing manufacturing industries, and it may now be described as a semi-industrialised country. About 20% of the national labour force is employed in industry, as against 30% in agriculture. Industrial development owes much to the *Corporación de Fomento de la Producción* (Chilean Development Corporation), which, among other things, has helped to plan and finance power development and fostered the creation of an iron and steel industry. Industries are very diversified, and include foodstuffs, footwear, tobacco, textile, clothing, chemical, pharmaceutical, rubber, radio, electrical, paper, furniture, and metal manufactures.

Although mining employs less than 5% of the labour force, it accounts for 85%, by value, of the exports. Because of this, it is necessary to look at Chile's mineral wealth in a little more detail, and this is done in the following section.

MINERAL WEALTH

Chile possesses abundant and varied mineral wealth. For many years minerals have formed the economic mainstay of the country and are still the dominating commercial factor.

Large deposits of natural sodium nitrate occur in the northern desert, having been preserved by the extreme aridity of the climate. The deposits are found in the beds of former lakes which existed on the valley floor and extend over a distance of some 450 miles between 19 and 26 degrees S. latitude. The nitrate beds or *caliche* vary in thickness from a few inches to many feet and occur at or near the surface. The crude nitrate is excavated by giant shovels and taken to the *oficinas* or nitrate-treatment plants, where the stuff is refined. The nitrate is either sacked or carried in bulk by rail to the exporting ports (Fig. 125).

Fifty years ago Chile enjoyed a virtual world monopoly of this valuable fertiliser. During the First World War the nitrate export trade was drastically curtailed. Unable to secure supplies of natural nitrate, German scientists perfected the nitrogen-fixation process. The production of synthetic nitrates in large quantities dealt a severe blow to Chile, and the export trade was greatly reduced. Although the annual output had declined from about 3 million tons just after the First World War to half that amount in the years immediately preceding the Second World War, post-war production has shown a slight increase, and the average output for the years 1949-51 was 1,668,000 long tons. During the past two decades great changes have taken place in the industry; the bulk of the nitrate production now comes from two giant plants which not only operate on new principles but also treat ores of low nitrate content. Just over 1 million tons a year are produced.

Iodine is also produced as a by-product of the nitrate industry, and Chile normally accounts for about three-quarters of the total world supply. Production is governed by market considerations; it usually amounts to about 1000 tons.

Copper has been worked in the mountains of northern Chile for several centuries. Large deposits of copper ore exist here and, on the basis of known world deposits, Chile possesses about one-third of the total. The ores are of low grade but are exploited by modern large-scale methods at Chuquicamata and Potrerillos. Copper is also mined at El Teniente in central Chile. Copper alone accounts for more than half, by value, of Chile's exports. Annual production is about 600,000 tons.

Among other minerals of value, though on a lesser scale, are gold, silver, manganese, molybdenum, sulphur, salt, iron, and borax. Gold and silver are now largely derived from the refining of copper. In the province of Coquimbo, in the region around La Serena, considerable deposits of pure, non-phosphoric, sulphur-free iron ore occur; about 5 million metric tons a year are mined. Borax, of which Chile produces approximately 50% of the world total output, and sulphur of high-grade quality occur in unlimited quantities in the Andes of northern Chile. Sulphur is, of course, associated with the volcanoes, borax with the dried-out lakes.

With respect to fuel and power supplies Chile is very fortunate. The South American continent is notoriously lacking in coal resources, yet some of the few deposits are found in Chile. The main deposits occur near the Gulf of Arauca; unfortunately the reserves are not very extensive. Annual production is about 2 million tons. Chilean coal, though soft, is of fairly good quality. Oil was struck in Tierra del Fuego in 1945, and by 1957 production had reached 4.8 million barrels a year. In 1962 the annual output had increased to just over 11½ million barrels. There are indications that a fairly extensive petroliferous region occurs in southern Chile. Finally, Chile possesses abundant resources of potential hydro-electric power, only a small fraction of which, so far, has been harnessed.

CHILE: REGIONS

It has already been noted that between the coastal range of mountains and the Andean cordillera there exists a central valley. This trough varies in its physical nature from north to south: in the north it is broken into a series of basins and partly filled in by alluvial fans, in the centre it partakes of a true corridor, while southwards it first becomes blocked with glacial moraines and then is invaded by the sea. If one superimposes the three dominating climatic regimes—the hot desert, the Mediterranean, and cool temperate marine—upon the physical framework of Chile it is possible to distinguish three major divisions within the country.

To these three commonly recognised and accepted natural regions of Desert Chile, Mediterranean Chile, and Forest or Cool Temperate Chile, G. J. Butland has added a fourth, Atlantic Chile. It consists of, he maintains, "the territory on both sides of Magellan's Strait to the east of the Andean cordillera, and so including the plains of northern Tierra del Fuego and southern Patagonia, adjoining Argentina. In many aspects it is more orientated to the Atlantic and to Argentine economic life, although the political connexion with Chile is a strong one."* Structurally, climatically, and in other respects this area of Atlantic Chile stands apart from the other three main sections of the country, and there is every justification, therefore, for accepting it as a fourth major region of Chile. There are some geographers, too, who prefer to distinguish the Andes as a separate region.

Here, while accepting the above regional divisions, we shall divide Chile simply into three sections, viz. Northern, Central, and Southern Chile. Central Chile, which consists of the Mediterranean region with its transitional semi-arid zone in the north and its transitional mild, moist forest zone to the south, is the core area of the country; here live over 90% of the people. The northern and southern wings of Chile have only some 500,000 and 300,000 people respectively. Both are, in a sense, pioneer areas where man lives on sufferance.

NORTHERN CHILE

The northern section of Chile, extending from Arica to Coquimbo, is of little value apart from its mineral wealth. The desert strip along the coast of Peru is continued into northern Chile, where it forms part of the extremely arid Atacama Desert. The records of many places, Calama, for instance, show no precipitation at all; others, such as Iquique, record 1 in. in five years! Yet this desert region with its sand dunes and bare hills is not economically unimportant, neither is it devoid of population. The people are there, of course, mainly because of the wealth derived from the extraction of minerals, chiefly nitrate and copper but also, to a lesser extent, iron, borax, and sulphur.

* *Chile*. London: Royal Institute of International Affairs. 1951. P. 11.

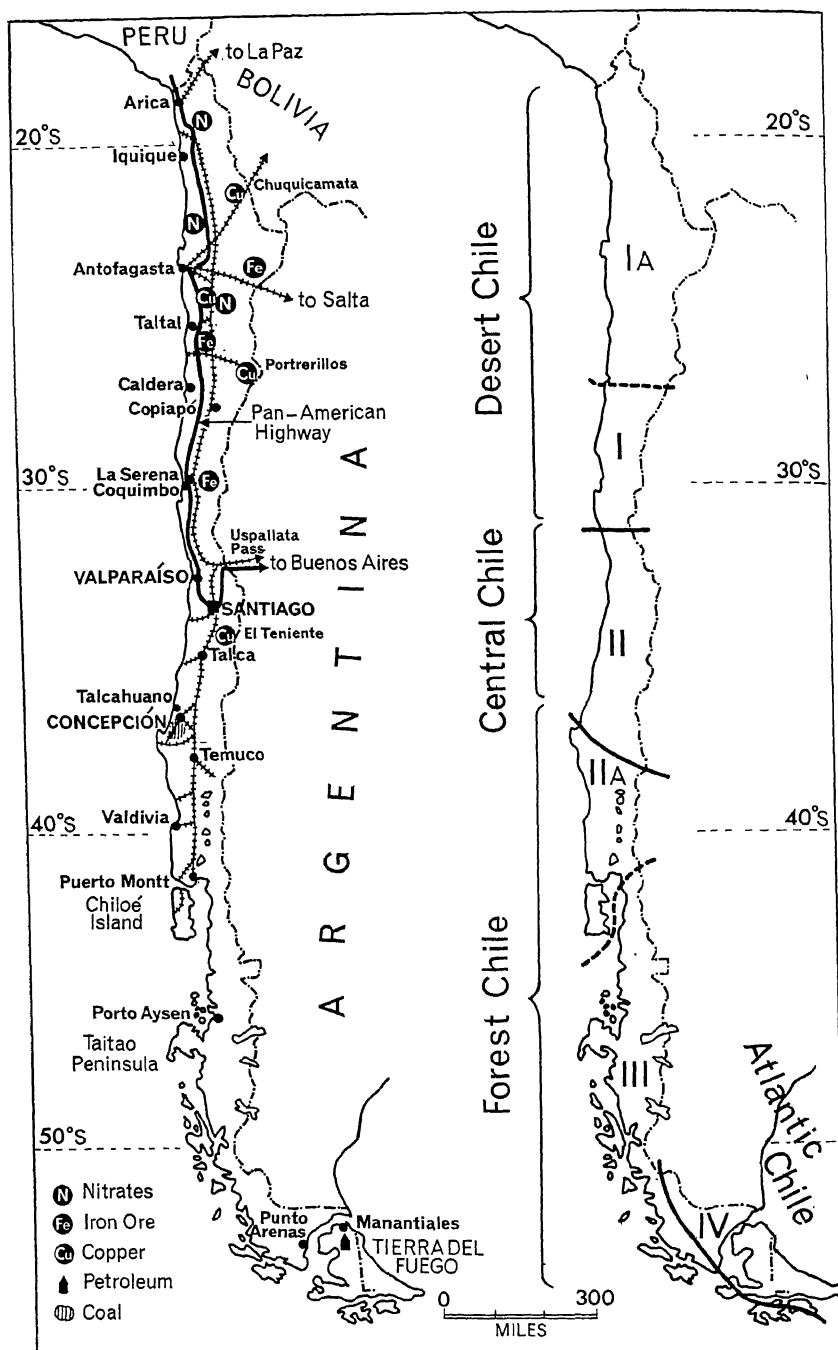


FIG. 126.—Chile: general features and regions. Because of Chile's inordinate length the railway spinal column is of great importance. The Pan-American Highway goes only as far as the capital.

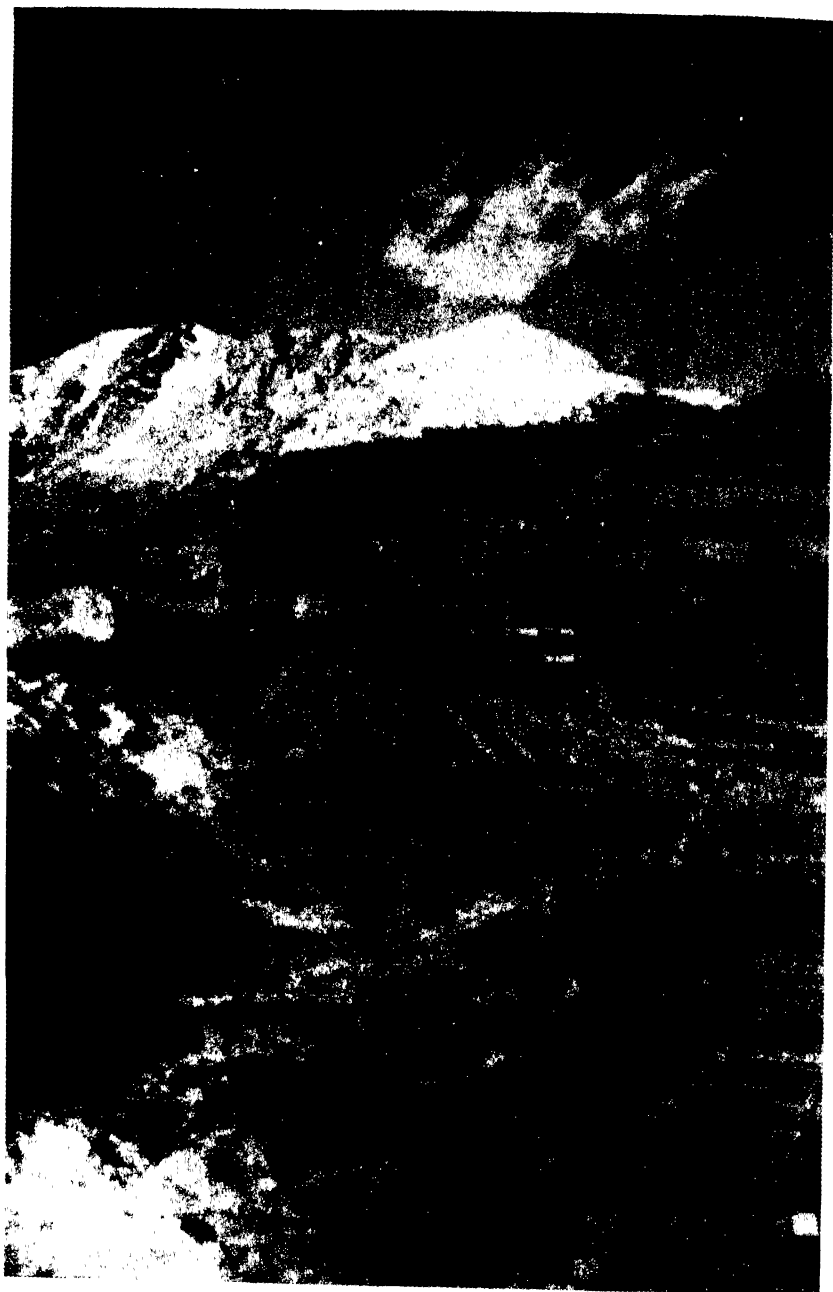
Some thirty or forty years ago Chilean saltpetre was produced in about a hundred *oficinas*, and during the years of peak production the nitrate fields provided employment for some 60,000 workers. In former days the ore was quarried by hand, and only that which contained over 15% of nitrate could be profitably treated. Nowadays, partly as a result of the competition from synthetic nitrates and partly as a result of modern production techniques, exploitation is limited to about 20 *oficinas*. Two of these, the new Maria Elena and Pedro de Valdivia plants, with an annual production capacity of 600,000 and 750,000 tons respectively, produce the bulk of the nitrate output. These modern plants treat caliche with as low as 7% concentrate (see Fig. 128).

Copper is mined at Chuquicamata and Potrerillos. Mining began in the former place in 1915. Chuquicamata today is the largest copper-mining plant in the world and produces half the entire Chilean output. Already some 500 million tons have been mined, but, even if the plundering continues at the current rate, reserves are sufficient to give it another hundred years of life. Recently another rich find, perhaps the richest copper-ore deposit in the world, has been discovered some 10 miles from Chuquicamata.

Apart from the mining camps, most of the people in northern Chile live in the coastal towns. The almost harbourless coast has a string of ports. These ports serve two purposes: they serve as outlets for the trade of land-locked Bolivia and export Chile's own mineral products. Arica and Antofagasta are both linked to Bolivia by railway, and something in the region of two-thirds of Bolivia's exports and a third of her imports go via these Chilean ports. The other ports—Caleta Buena, Iquique, Tocopilla, Mejillones, Taltal, and Caldera—have developed at convenient anchorage points along the coast and act as outlets for the mineral wealth in the desert and mountains directly behind them. Most of them are merely open roadsteads.

Living conditions in the northern settlements, whether ports or mining centres, are completely artificial. Here, where the land is utterly barren and rainfall and rivers virtually non-existent, everything required—food, fuel, equipment, sometimes even water—has to be imported. In the more southerly section of the desert, where conditions are less arid and approach the semi-arid, agriculture is carried on in irrigated oases, the water being supplied by the Andean streams. These ribbon settlements, *e.g.* the oases of Copiapó and Vallenar, supply some of the foodstuffs required by the mining centres.

Population in northern Chile is obviously small and scattered. The total population numbers only about 500,000; this is a mere 7½% of the country's total. Apart from the mining centres and the oasis settlements, the population congregates in the coastal towns. These towns are dependent entirely upon the mineral export trade and the indispensable import trade. Many of the former settlements in the desert north have been abandoned, and some of the towns have an air of decay about them. The future of



[Courtesy: B.O.A.C.]

FIG. 127.—El Teniente copper mine. This mine, about 50 miles south-east of Santiago, produces about a quarter of Chile's copper. It lies high in the Andes. The entire process of mining, concentrating, smelting, and refining is carried on here.

northern Chile is somewhat problematic. Its progress and prosperity is intimately linked up with mineral exploitation; any decline in this would have serious repercussions. Alternative methods of gaining a livelihood are restricted in the extreme. There are, it is true, certain possibilities for tropical agriculture in the fertile but undeveloped Azapa and Lluta valleys in the extreme north and restricted possibilities for livestock grazing in the semi-desert region of the south, but such developments would not solve northern Chile's dilemma.

Of the towns of northern Chile, Antofagasta (77,800) is the largest and most populous centre. It is the foremost commercial centre of the desert north, exporting the minerals of a wide mining area and carrying a large proportion of Bolivia's trade. Antofagasta Bay, protected by a massive breakwater, provides sheltered anchorage for ships. The city's water supply has to be brought from San Pedro in the Andes, a distance of 193 miles, since there are no local supplies. Antofagasta may claim to be an industrial town, for it has several factories making among other things garments, soap, paints, tiles, canned goods, beer, and ice. Iquique (56,000), long famous as Chile's great nitrate port, was originally founded by the Spaniards in the sixteenth century. Iquique has suffered devastation by both earthquake and fire. Like Antofagasta, the city depends for its water supply entirely upon a pipeline which carries water from the oasis of Pica 60 miles away. Copiapó (32,000) is the capital of Atacama province and a notable copper-, gold-, and silver-mining centre. It is linked by railway to the small port of Caldera, some 50 miles distant, which serves it. In the extreme south, on the edge of the desert, lies La Serena, an old-world town, full of charm and interesting buildings. Founded as long ago as 1544, it has a population of about 57,000. Though not itself a mining town, it is near El Tofo, where the Bethlehem Chile Iron Company works an important ironfield. About 9 miles to the west of La Serena lies the port of Coquimbo. Coquimbo (39,000) has one of the best harbours on the entire northern coast; it is a considerable port, exporting minerals, hides, and wool, and serves the mixed agricultural and mining district around La Serena. Coquimbo has several small industries. Guayacan on Coquimbo Bay ships the iron ore from the iron mines at El Romeral a few miles to the north.

CENTRAL CHILE

This middle section of Chile may be said to extend from Coquimbo to Puerto Montt, that is approximately between 30 and 42 degrees S. latitude. This central region may, in fact, be divided into three subsections: first, northern Central Chile between 30 and 33 degrees S., which has semi-arid conditions; secondly, Mediterranean Central Chile between 33 and 38 degrees S., which has a Mediterranean climatic regime; and, thirdly, southern Central Chile between 38 and 42 degrees S., where cooler and moister conditions prevail.

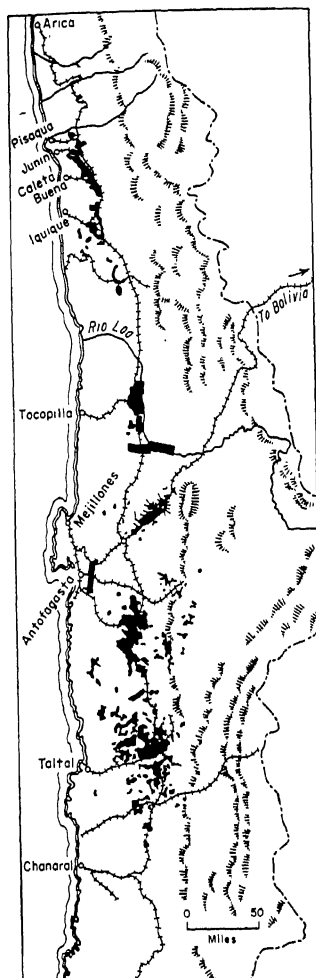
The Mediterranean portion is the real core of Chile. This is the most

thickly populated, most urbanised, and most productive part of the country, both agriculturally and industrially. Conditions here resemble those in other parts of the world having a Mediterranean type of climate, but especially those in California. Like California, Mediterranean Chile is divisible into three parallel north-south belts: near to the coast is a coastal range; beyond this is a down-faulted central depression; and east of this valley is the high, young fold mountain chain of the Andes. On the coastal range and on the lower slopes of the Andes there is much good grazing land, and livestock ranching has developed. In the valley, where there are fertile alluvial soils, cereals, citrus fruits, vines, vegetables, and fodder crops are grown. Cultivation is generally undertaken with the aid of irrigation, since the summer season is one of drought. Abundant supplies of water are available from the mountain streams descending from the Andes; moreover, irrigation is easy, since the water can be distributed by ordinary gravity canals.

Of the food crops wheat is the most important, although maize is grown in considerable quantities, even though it yields poorly, since it is the main food of the Chilean peasants. Sugar-beet is a crop of growing importance. Barley, potatoes, beans, peas, onions, peppers are other food crops. Citrus fruits and vines are of importance locally, but do not cover extensive areas. The greatest area of vineyards—some 40,000 acres—occurs in Nuble. Grapes are grown chiefly for wine-making, and Chile produces some good-quality wines. Other crops of note are the industrial crops of sun-flowers, hemp, and tobacco. Vast areas of the valley are given over to livestock raising; in fact, it may be said that the predominant use of the land is for pastoral purposes, the land being used either directly as pasture or for the production of animal feedstuffs, such as alfalfa and clover. Cattle from the hills are frequently driven down into the irrigated valleys towards the end of the summer season to feed on the crops, such as maize, which have been cultivated during the summer under irrigation.

Perhaps the most surprising fact concerning agricultural production in the Mediterranean region is the small emphasis placed upon citrus-fruit cultivation. One might have expected Chile to follow in the footsteps of other Mediterranean regions and to have specialised on such lines; as it is, production is relatively slight, no oranges and few lemons are exported, while practically no grapefruit are grown. The limited acreage devoted to citrus fruits results from the smallness of the home market and the difficulty of export due to the remoteness of Chile from world markets.

North of Santiago the great valley as a distinct depression disappears; likewise the Mediterranean climate degenerates into semi-arid conditions. Thus the area between Santiago and Coquimbo, more or less coterminous with the provinces of Aconcagua and Coquimbo, is a transitional region. In this zone the raising of livestock, particularly sheep and goats, tends to assume first importance. Some mining, chiefly of copper and iron, does take place, but it is secondary. There is also considerable agricultural activity where irrigation water is to be had and, in point of fact, the provinces



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FIG. 128.—The nitrate deposits of Northern Desert Chile.

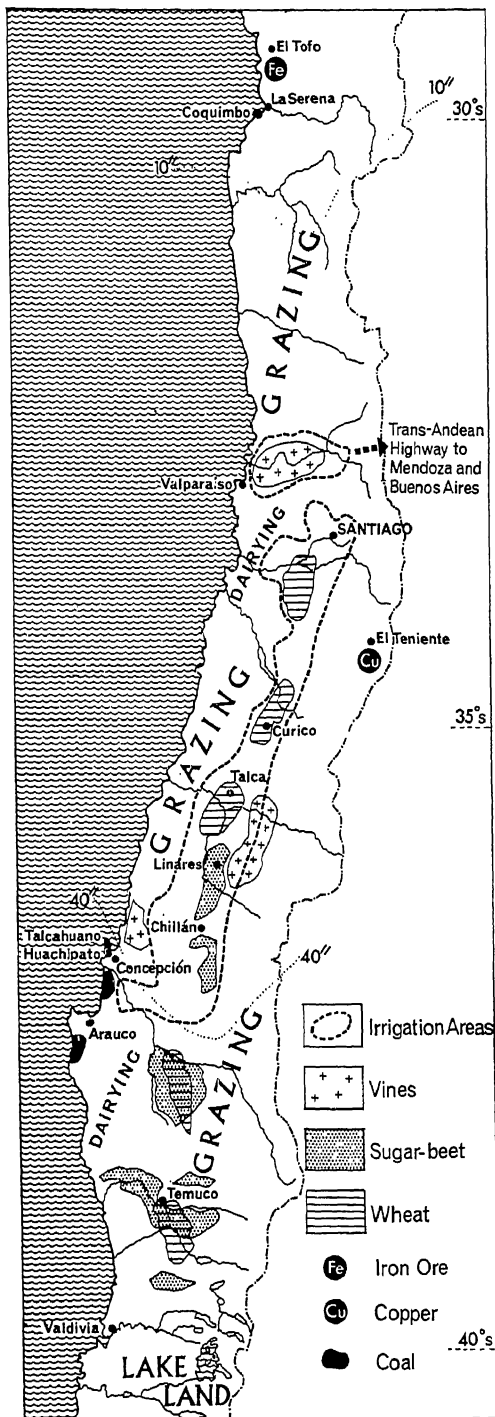


FIG. 129 (right).—The Chilean Heartland.

of Aconcagua and Coquimbo not only supply all their own needs but are also able to export a certain amount of food to the northern provinces.

Just as the Mediterranean climate peters out north of Santiago so south of Concepción it begins to give way to cool temperate conditions. The dry season gets shorter and shorter and beyond the River Bío-Bío there is rain all the year round. This southern section of Central Chile, which extends as far south as Puerto Montt, exhibits considerable differences, not only in climate but also in conditions of topography and soil, from the Mediterranean provinces immediately to the north. Here the central valley is cut up by hills, water is plentiful, and forest abounds. It is a land of trees, green fields, rivers, and lakes. Between Temuco and Puerto Montt is a distinctive tract of country known as the Chilean Lakeland: here is a cluster of large lakes framed by forests and overlooked by towering snow-capped volcanic cones. The scenic qualities of this part of Chile are unrivalled. Already some tourist centres have grown up, but large-scale development is unlikely—or at least will be slow to emerge—because of the small moneyed class in Chile and the fact that it is too far removed from other South American centres of large population. It is here that the Araucanian Indians or Mapuché dwell, living on isolated farmsteads in the *reducciones* or Indian reservations. These Mapuché show little cohesion, are backward, and have little community life.

North of the lake country with its richly wooded landscape lie the northern Araucanian lowlands, an area of rolling hills. “‘Cut-over’ land, won from the pervasive forest, is the typical landscape.” Although the Spaniards penetrated so far south and established a few settlements, the region today is mainly inhabited by Germans, Swiss, French, British, and Yugoslavs. Germans predominate, and the town of Osorno, for example, is almost entirely a German town. The German immigrants found the region very reminiscent of Bavaria and felt very much at home here. The Teutonic touch is very much in evidence in this part of Chile: the colonists have built farms and settlements which have a distinct German flavour and even patterned the landscape after the fashion characteristic of the rolling plateau of their original homeland. Farming in this region is not particularly easy, but the industrious farmer prospers. The farmers grow oats, root crops, flax, and peas, and rear livestock. The rich pastures and mild winters favour cattle-farming. Pig-farming is also important. The heavy forest cover of this area and the adjacent lake-land country has given rise to lumbering, and many of the Germans are showing an interest in the timber industry.

The overwhelming bulk of the population of Chile live in Central Chile, particularly in the Mediterranean sector. In the latter, which covers a mere 18% of the national area, live some 75% of the total population. Most of these, too, are concentrated in the three provinces of Santiago, Valparaíso, and O’Higgins.

Chile’s major cities are congregated in the central section of the country. Santiago (2,300,000), the state capital and seat of government, is the fourth

largest city in the continent. Its growth, especially during recent years, has been spectacular. Santiago is attractively situated: it lies in a wide plain backed by the snow-capped peaks of the Andes. It is a modern city with a busy, prosperous, go-ahead character. Santiago is also Chile's chief industrial town, and nearly half of the country's manufacturing is carried on here.

Some 50 miles west of Santiago lies Valparaíso (275,000), the chief port of Chile. It owes its importance to its position in a gateway to the ocean from the densely populated heart of Chile. Valparaíso is the western terminus of the Trans-Andine Railway, which links Chile with Argentina via the Uspallata Pass. Like Santiago, Valparaíso has developed many industries, *e.g.* textiles, footwear, tanneries, chemicals, sugar-refining. Concepción (165,000), 6 miles up the Bío-Bío river, is the most important city of south-Central Chile. Nearby, chiefly in Lota, Coronel, and Penco are the most important coal mines in the country. These coal mines serve the Huachipato Iron and Steel Plant, which is located on San Vicente Bay, some 6 miles west of Concepción. Construction of this plant began in 1947, and the completed steelworks were in operation by the end of 1950. Various improvements and expansions have taken place since that date, and the capacity of the plant has been about doubled. In 1958 the plant produced 330,000 metric tons of finished steel products.

Valdivia (85,000), capital of the province of that name, is about 200 miles south of Concepción. It is Chile's fourth most important industrial centre, having shipyards, flour mills, breweries, sugar-refineries, and large footwear factories. Puerto Montt (60,000) is the southern terminus of the longitudinal railway and the point of embarkation for Chiloé, Aysen, and Punta Arenas. In 1960 both Valdivia and Puerto Montt were devastated by a series of severe earthquakes.

SOUTHERN CHILE

The southern archipelagic portion of Chile from the island of Chiloé to Cape Horn exhibits marked contrasts with the mainland north of Puerto Montt. It is a realm apart where Nature reigns supreme and where the hand of man has scarcely been felt. It is a land of mountains, ice fields, glaciers, fiords, islands, and wild forests. It is a cold, windy, rain-drenched wilderness. It falls into Professor Fleure's category of a "region of difficulty," for this bleak, storm-swept land affords little return for man's efforts. Not that many men live here: it is a region with a very low density of population. Altogether, there are only about 150,000 inhabitants in this archipelagic region, of whom about 100,000 dwell in Chiloé island. Most of the rest live in the settled part of the Simpson valley.

Rather low temperatures, heavy orographic rainfall, and podzolised soils severely limit agriculture in Southern Chile. In the north, in the provinces of Llanquihue and Chiloé, oats and potatoes are the chief crops and are produced in considerable quantities. Pastoral activities are important, with emphasis on cattle- and pig-keeping; sheep-farming is relatively

unimportant. Roughly, about one-third of the area in this northern section of Southern Chile is suitable for farming. Such land as is farmed, of course, has had to be cleared of forest, for the forest is all pervasive in this part of the country. The land is difficult and costly to clear. The island-studded section south of Chiloé is of very little importance or value from an agricultural point of view, and crop growing is virtually absent. Butland sums up the position thus: "The rainy, fiord-braided coast and the windswept archipelago offer few possibilities now or in the future."*

South of the 37th parallel forest dominates the coastal fringe, although between 37 and 41 degrees S. considerable areas have been cleared. The plentiful rainfall encourages a heavy forest growth, which includes broad-leaved evergreens as well as conifers. In the extreme north beech and cedar and farther south larch and pine are the most valuable trees. The forest deteriorates in quality polewards. By and large, indeed, the quality of Chilean lumber is not of the highest. South of the 41st parallel there is very little lumbering, since the forests are so wet that cutting and handling of timber are not easy. North of the 41st parallel, however, lumbering is important. Forestry, incidentally, ranks next after mining and farming in the Chilean economy. The forest is exploited in the provinces of Valdivia, Osorno, Llanquihue, and Chiloé, and there are many saw-mills in this part of Chile. Most of the forest in the provinces of Aysen and Magallanes remains untouched and constitutes a valuable reserve, although much of it covers difficult terrain and is not easily accessible. Puerto Montt is the major timber-shipping centre. Castro and Ancud on Chiloé Island are minor ports exporting timber.

The area designated Atlantic Chile by Butland comprises the relatively low-lying, undulating country on either side of the Straits of Magellan to the east of the Andes. Since these plains lie to the leeward of the mountains, they are in a rain-shadow area. The heavy rainfall of the windward regions is absent here; precipitation totals only about 20 in. Temperatures are equable. As a result of these climatic differences forest is replaced by grassland, of which there is some 15 million acres, providing valuable pastoral land. Extensive sheep-rearing is carried on, and some 3 million animals—just over half the total number of sheep in Chile—are found in the pampa region of Magallanes and northern Tierra del Fuego. Sheep-grazing on these Chilean pastures is practised on an extensive scale, and the sheep farms are large. Wool, skins, tallow, frozen and canned mutton are exported in large quantities. Punta Arenas (46,000), originally a convict station, is the capital of Magallanes territory and the chief exporting centre.

Until very recently sheep-raising dominated the economy of Atlantic Chile, but the discovery of oil may well challenge this dominance. Oil was struck on the island of Tierra del Fuego in 1945 at Manantiales. Since then petroleum has been located also at Punta Delgada on the mainland.

* *Op. cit.*, p. 69.

Total output in 1962 was slightly over 11½ million barrels. Most of the crude petroleum is moved by pipeline from Manantiales to the newly built port of Caleta Clarence on Gente Grande Bay. A small portion of the oil is refined at Manantiales to serve local needs. Hopes run high that this is a petroliferous region of some substance. Should it prove to be rich, it is likely to change radically the economic value of Southern Chile to the State.

CHILE'S PROBLEMS

Finally, let us review, briefly, Chile's difficulties and problems, some of which we have already referred to.

First, the republic suffers from a number of geographical difficulties: the elongated character of the country brings problems of political cohesion and unity; her relative remoteness and inaccessibility militate against the more effective realisation of such assets as her timber wealth and scenic attractions; the shortage of water in the northern half of Chile restricts occupation and development; and earthquake hazards, such as the dreadful catastrophe of 1960, are still to be expected.

Secondly, Chile has economic difficulties. She has experienced a high degree of inflation; for instance, in 1955 the cost of living in Santiago went up by 85%, thus Chile achieved the dubious distinction of recording the highest rate of inflation in the world with the exception of South Korea.* Furthermore, Chile is very much a one-product country, depending over-much upon copper, whose export earnings are less than they might be, since the mines are owned by United States' mining corporations. Again, the decline of the nitrate industry has jeopardised the future of Northern Chile, while in Southern Chile there are problems arising out of the region's dependence upon sheep. As Butland has said,† the frontier of settlement in Southern Chile is closed, for no unoccupied land is available for immigrants, and any increased settlement must depend upon the subdivision of the present holdings.

Thirdly, there is a social problem which is chiefly a by-product of the old-established hacienda system. The large estate is especially characteristic of "Mediterranean" Chile; in fact, here over 95% of the land is in the hands of a rich aristocracy who make up only about 3% of the landowners. Thus the bulk of the people are poor, landless peasants; moreover, these *inquilinos* are virtually tied to the estates. Great social contrasts exist, therefore, in "Mediterranean" Chile, and for the majority standards of living are low. There is need of land reform on two counts: first, to provide the peasantry with farms of their own, and, secondly, to secure a more efficient use of the large estates, which are often far from being fully or effectively farmed.

* *The Economist*, 23rd November 1957, p. 26.

† "The Human Geography of Southern Chile." *Institute of British Geographers*, no. 24, 1957.

THE FALKLAND ISLANDS

The Falkland Islands, well known by name but little known in fact, comprise an archipelago situated in the South Atlantic between latitudes 51 and 53 degrees S., lying some 300 miles north-east of Tierra del Fuego. They consist of two main islands, East Falkland and West Falkland, roughly the same size, together with their associated islands. The total area of the land surface is 4618 square miles. Topographically and scenically, the Falkland Islands, with their fiord-like inlets, evidences of glaciation, and wild grassy moorland, bear a resemblance to the eastern parts of Tierra del Fuego and are not unlike parts of northern Scotland. The climate, too, is similar to that of northern Scotland, being cool and cloudy, damp and wet. Lying far from land and exposed to the strong, persistent westerly winds, the climate is temperate but changeable, and winds of gale force strike the islands one day in every five. Winds are so prevalent and so fierce that trees cannot grow except in well-sheltered spots. There are, in fact, very few trees. Though the annual rainfall is not very high, about 30 in., the islands are damp and moist because of maritime influences.

The Falkland Islands constitute a British Crown Colony. Included under the Falkland Islands are the dependencies of South Georgia, the South Shetlands, South Orkneys, South Sandwich Islands, and the Antarctic territory of Graham Land. The Falkland Islands were discovered by the English seaman John Davis in 1592, but they received their name from Captain Strong, who made a landing upon them almost exactly one hundred years later. Subsequently both the French and the Spanish occupied the islands. In 1832 Britain re-asserted her rights, expelling the Argentinian garrison that was in occupation at that time. Ever since the Falklands have been a British possession, but Argentina has always refused to recognise British ownership. The islands remain a point of serious dispute between the two countries.

The total population of 2250 is almost exclusively of pure British descent, chiefly shepherds of Scottish ancestry. The inhabitants live mainly in East Falkland, where is situated the only town of importance, Port Stanley (1200). Arable farming is virtually impossible because of the cool, windy, sunless climate. On the other hand, grass grows all the year round, and there are some 3 million acres of pasturage which is suited to sheep. Sheep accordingly have become the mainstay of the islands' economy, and most of the people live by raising them. There are some 800,000 sheep on the islands. Many breeds, including Romney, Cheviot, and more recently Corriedale, have gone into the existing Falkland sheep. The islands yield about 5 million lb of fine-quality cross-bred wool a year. Sheep-breeding overshadows every other activity, to such an extent, indeed, that mutton is known as "365," since it is eaten every day in the year!

Life in these islands is hard and must perforce be simple. Conditions have produced a hard-working, self-reliant, and thrifty community, and despite the rather harsh conditions of these wind-swept islands, the people remain staunchly attached to their sheep farms.

Port Stanley, the capital, possesses a fine harbour and has repair yards for ships battered by their passage round stormy Cape Horn. It is also a calling-place for whalers bound for the Antarctic and has frequently served as a base for Antarctic expeditions.

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INDEX

Main references are indicated by figures in *italics*.

A

AGRICULTURAL system, 64-65, 69-76, 87
Agreste, 365, 375
 Air masses, 19-20
 Air transport, 97-98, 139, 229, 268, 297, 310, 316, 318, 343-344, 411, 427
 Alfalfa, 143, 147, 316, 422-423, 430, 435, 440, 446, 449, 478
 Alpaca, 280, 292, 313
Altiplano, 301-304, 310-314, 316, 318
 Amazon basin, 10-14, 16, 19, 26, 31, 35, 69, 107, 220, 235, 265, 273, 286, 294, 301, 323, 325, 336, 340, 400-415
 Amazon river, 11-14, 31, 91-92, 218, 220, 265, 281, 287, 298, 318, 324, 338, 342, 400-401, 405, 408, 410, 413-414
 American Mediterranean, 3
 Andean region, 440-441
Andenes, 38, 283
 Andes, 9, 11-13, 16, 28, 33, 35, 38, 50, 60, 78, 218, 220, 264, 269, 271, 277, 287, 301, 318, 416, 438, 467, 473, 476, 478, 482
 Antigua, 8, 203
 Antimony, 81, 135, 280, 284, 314
 Argentina, 14, 24, 33, 36, 41, 46, 49-50, 56, 58, 66, 69-70, 75-76, 79, 82-85, 87-88, 90, 93-95, 103, 106-107, 114-116, 119, 300, 309, 321, 330, 336, 416-441, 458, 464, 481, 484
 Arrowroot, 75, 205-206
 Asiatic peoples, 2, 43-44, 197, 209, 258-259
 Asphalt, 209-210
 Asunción, 17, 62, 92, 451, 453-456, 458-460, 463-464
 Atacama desert, 34, 467, 469, 473
 Aymaras, 303-304
 Aztecs, 71, 122, 128, 149

B

Babassu palm, 380
 Bahamas, 74, 108, 179, 214-216
 Balata, 261, 408
 Balsas, 313
 Bananas, 75, 133, 151, 169, 171, 198, 234, 265-266, 331, 366

Bandeirantes, 348
 Barbados, 8, 52, 196, 207-208
 Barley, 147, 233, 266, 272, 279, 312, 316, 421-422, 446, 449, 471
Barrancas, 142, 418
 Bauxite, 76, 80-81, 193, 198, 257, 260, 263, 323, 332, 357, 394
 Beans, 73, 141, 143, 147, 149, 156, 160, 168-169, 208, 220, 272, 331, 356, 377, 387, 456, 471, 478
 Belize, 111, 173, 175
 Bogotá, 2, 221, 225-228, 230, 233
 Bolivia, 10, 12, 28, 56-57, 63, 72, 75, 79, 86, 98, 110, 286, 294, 300-319, 321
 Boro, 411-413
 British Honduras, 49, 61, 111, 115, 173-177
 Borax, 472
 Brasília, 56, 107, 322, 343, 397-398
 Brazil, 4, 26, 28, 33, 36, 43, 45, 48, 50, 52, 57-58, 62-63, 65, 69, 71-72, 74, 80-81, 83, 87, 93-95, 107, 273, 321-415, 432, 442, 452
 Brazilian Plateau, 8, 10, 15, 18, 27, 35, 62, 323-325, 391-400, 463
 Brazil nuts, 336, 406
 British Caribbean Federation, 195-196
 Buenos Aires, 5, 6, 416, 419, 427, 430-431, 452

C

Caatinga, 31, 325, 375, 378, 380
 Cacao, 74-75, 149, 152, 165, 171, 188, 197, 205-206, 209, 211-212, 247, 250-251, 265, 270, 296, 316, 331, 365-367, 406, 410
 Cadmium, 134
Caliche, 471
 Campos, 33, 71, 335, 393, 395, 400
Campos de varzea, 15, 324
 Cana, 456
 Canadas, 417
 Caneros, 422
 Canga, 392
 Caracas, 61, 85, 240-241, 249-250
 Caribbean Sea, 3, 7, 19, 35, 43, 45, 156, 161, 165

- Carnuba wax and palm, 75, 337, 378-379
 Cassava, 206, 208, 259, 321, 331, 388, 412, 461
 Castor seed, 332, 371
 Cattle, 132, 147, 153, 159, 166, 169, 183, 200, 222, 234-235, 253-254, 261-262, 266, 280, 318, 333, 335, 377, 387, 389, 395-396, 399, 406, 423, 428, 433, 445, 447-448, 462
 Cauca river, 9, 13, 91, 219, 227-228, 231
 Cayman Islands, 8, 202
 Central America, 3, 5-7, 26-27, 29, 31, 34, 37, 42, 48-49, 56, 80, 83, 93, 117, 120, 157, 160-161, 171
 Chaco, 104, 113, 417, 420, 432-435, 454, 460, 464-466
 Chapadoes, 392
 Chernozem, 36-37
 Chibchas, 230
 Chicla, 75, 150, 156, 177, 234, 405
 Chile, 5, 9, 17, 20, 24, 29, 34, 37, 41, 43, 45, 50, 58, 65, 69, 77, 81, 88, 94, 96, 104, 106, 113, 115-116, 119, 269, 287, 300, 467-483
 Cholos, 303-304
 Chromite, 183, 243, 394
 Climate, 4, 17-29, 127-128, 146, 158, 161, 165, 174, 198, 209, 215, 239-240, 258, 271, 294, 302, 311, 315, 325-326, 348, 352, 374-375, 402, 435, 443, 468, 477-478, 481-482, 484
 Coal, 82-83, 136, 144, 164, 223-224, 281, 293, 339, 384, 425, 440, 479
 Coca, 59, 75, 279, 286, 316, 318, 405, 412
 Coconuts, 162, 200, 206, 209, 211, 220, 259
 Coffee, 63, 75, 131-132, 149, 151-152, 159, 161, 163, 169, 194, 199, 212-213, 220, 229, 231, 233, 247, 251, 265, 270, 279, 296, 316, 329, 331, 350-356, 464
 Colombia, 3, 6, 10, 13, 24, 36, 45-46, 58, 61, 69, 72, 77, 80, 82, 87-88, 91, 93, 95, 97, 103, 107, 111-112, 117, 217-236, 321
 Colonos, 356
 Communications, 90-98, 127, 139, 142, 157, 164, 167, 177, 185, 226-229, 260, 268, 285-286, 297, 309-310, 342-344, 400, 411, 413-414, 426-427, 447, 452, 458-460, 466
 Conuco cultivation, 38, 248
 Copper, 78-80, 134-135, 143-144, 164, 191, 193, 223, 243, 263, 266, 280-281, 286, 293, 307, 314, 332, 384, 394, 418, 441, 457, 469, 472-473, 476, 483
 Costa Rica, 2, 43-44, 56, 68, 74, 77, 83, 88, 96, 120-121, 167-170
 Cotton, 74-75, 88, 131-133, 139, 144, 150, 152, 159, 166, 188, 203-204, 206, 220, 231, 247, 279, 289, 331, 356, 365-366, 368-369, 381, 422, 457, 461-462
 Cotton textiles, 139, 144, 150, 225, 231, 267, 341, 424, 446, 450, 458
 Cuba, 37, 45, 63, 77-78, 83, 103, 179-180, 181-186, 214
 Cuchillas, 442
 Curaçao, 213-214, 252
- D
- Diamonds, 81, 242-243, 255-257, 261, 323, 328, 339, 349, 357, 394, 399
 Disease, 57-58, 150, 172, 414
 Dominica, 204-206, 212
 Dominican Republic, 45, 58, 74, 81, 103, 109, 188-193
 Drainage, 13-17, 257, 259, 325, 334, 408
 Dutch settlement, 385, 387
- E
- Earthquakes, 9, 138, 165, 188, 481
 Ecuador, 9-10, 28, 83, 91, 94, 102, 111-112, 118, 264-275, 287
 Ejido system, 130
 El Dorado, 65-66
 El Salvador, 158-161
 Emeralds, 81, 223-224
 Engenhos, 368
 Estancias, 65, 448
 Esteros, 417
- F
- Falkland Islands, 114, 116, 484-485
 Family life, 54-55
 Favellas, 62
 Fazendas, 65, 352-354, 366
 Fincas, 220
 Fish-farming, 377
 Fishing, 141, 148, 152, 163, 172, 182, 199, 202, 216, 243, 251, 270, 280, 337-338, 372, 411
 Flax, 430, 480
 Forests, 31-32, 150, 163, 174, 176-177, 273, 280, 296, 315, 325, 336-337, 365, 375, 383-384, 402-404, 454, 463-464, 480, 482
 French settlers, 241, 468, 480
 French West Indies, 212-213
 Frigorificos, 389, 432, 439, 446, 448
 Frosts, 20, 351, 388, 392

G

- Galapagos Islands, 264, 274
Garua, 288
 Gauchos, 345, 389, 444
 Geophagy, 59, 318
 German settlers, 43, 241, 334, 346, 385-386, 419, 455, 466, 471, 480
 Goats, 144, 280, 333, 335, 377, 423, 465, 478
 Gold, 80-81, 101, 135, 143, 151, 159, 163, 168, 191, 193, 222-224, 255, 257, 261, 266, 271, 276, 284, 323, 328, 339, 357, 368, 394, 418, 472
 Grenada, 204, 207
 Ground-nuts, 388, 421, 449, 461
 Guadeloupe, 114, 204, 212-213
 Guanaco, 65, 428
 Guano, 82, 274, 280, 291
 Guánico Project, 254
 Guatemala, 40, 43, 68, 79, 111, 120, 125, 154-158
 Guayule, 143
 Guiana Highlands, 11-12, 27, 35, 237-238, 240, 255-256, 323
 Guianas, 21, 48-49, 256-263
 Gulf of Mexico, 3, 7, 22, 125

H

- Hacienda*, 1, 65, 129, 144, 282, 292, 470-471
 Haiti, 45, 48, 53, 72, 81, 109, 186-188
 Havana, 183, 185-186
 Health, 57-59
 Henequen, 75, 139, 153, 156, 183
 Hispaniola, 7, 37, 179-180, 186-193
 Honduras, 40, 68, 77, 161-164
 Housing, 59-61
Hoyas, 264
 Humboldt Current, 18-19, 24, 288, 290-291
Huasipungos, 272
 Hurricanes, 20, 174, 184, 187, 193, 198, 201, 205, 208-209, 213
 Hydro-electric power, 17, 76, 85-86, 133-134, 139, 148, 155, 160, 167, 224, 267, 290, 300, 340, 342, 347, 357-358, 376, 383, 425-426, 434, 448, 457

I

- Illiteracy, 56-57, 87, 121, 162, 188, 304
 Incas, 70-71, 95, 230, 276, 310
 Indian peoples, 42-43, 46, 53, 60, 128-129, 142-143, 157, 159, 161, 176, 230, 236, 240, 252, 264, 272, 274, 278, 292,

- 299, 303-304, 326-327, 404-405, 411-413, 419, 444, 454-455, 465, 468, 480
 Industry, 86-90, 138-139, 224-226, 340-342, 388-390, 424-425. *See also* specific manufactures
Inquilinos, 65, 470, 483
 Insect pests, 253, 395, 465
 Iodine, 472
 Iron and steel, 138, 149, 255-256, 267, 341-342, 359-360, 436, 481
 Iron ore, 76-77, 136, 144, 182, 246-247, 255-256, 263, 284-285, 319, 339, 357, 390, 399, 436, 469, 472, 474, 477, 479
 Irrigation, 17, 70, 131-132, 134, 141, 143, 145, 153, 259, 279, 289, 296, 373, 376, 478-479
 Italian settlers, 43, 241, 334, 346, 385, 419, 455, 466, 468

J

- Jamaica, 8, 37, 55, 81, 108, 174, 179, 196, 197-202
Jangada, 369
 Japanese settlers, 43, 334, 385, 387
 Jesuits, 53

K

- Kenaf, 319

L

- Ladinos*, 154
 Language, 52-54. *See also* Illiteracy
 La Paz, 141, 302, 314
 Laterite, 35-37, 155
Latifundia, 1
 Leaching, 35, 69, 155
 Lead, 79-80, 134-135, 143, 223, 263, 266, 280-281, 284, 293, 307, 314, 332, 357, 384, 426, 436, 441
 Leeward Islands, 202-205
 Le Tourneau Project, 286, 296-297
 Lima, 279, 281, 285-286, 290, 294
 Limestone, 153, 181, 198, 203-204, 207, 212, 214, 223, 323, 457
 Linseed, 74-75, 420, 446
 Llamas, 71, 273, 280, 292-293
 Llanos, 12, 33, 70, 217, 222, 238, 241, 249, 253-255
 Location, 3-5
 Locusts, 71, 433, 447, 465
 Lomas, 288

M

- Magdalena, 9, 13, 17, 91, 219, 227-228, 231

Maguay, 147
 Mahogany, 167, 176, 202, 243, 270
 Maize, 75, 141, 149, 152, 161, 166, 168, 200, 233-234, 247, 266, 272, 279, 316, 331, 333, 388, 396, 421, 430, 435, 449, 456, 461, 471
 Malaria, 58, 154, 294
 Manganesc, 76-78, 135, 223, 242, 261, 357, 406, 457, 469
 Manioc, 234, 260, 263, 331, 356, 377, 410, 456, 461
 Martinique, 114, 213, 368
 Mato Grosso, 398-399
 Matta, 365, 368
 Mayas, 71, 121, 154, 176
 Mennonites, 455, 460, 465
 Mestizos, 45-46, 121, 153, 159, 164, 182, 240, 272, 278, 292, 295, 303, 326, 405
 Mexico, 1-3, 6, 15, 24, 28, 33-34, 40, 49-50, 65, 70-71, 77, 79-80, 83, 85, 93, 103, 106, 109, 117, 120, 122-154, 181
 Mexico City, 5, 18, 94, 122, 145-148
 Milpa agriculture, 33, 35, 38, 40, 248, 270, 297
 Mining, 76-83, 141, 246-247, 260-261, 263, 272, 293, 307-308, 339, 357, 394-395, 399, 472, 478
 Mocambos, 371
 Molybdenum, 78, 284, 339, 472
 Montaña, 95, 277, 286, 294-295, 299
 Monte, 34, 428, 435
 Montevideo, 61, 386, 441, 444, 447-448, 450
 Montserrat, 8, 203, 205
 Mulattoes, 45, 182, 264, 326
 Mules, 143, 204, 322, 433, 465

N

Natural gas, 17, 85, 137-138, 426
 Negroes, 2, 44-45, 48, 118, 161-162, 165, 175-176, 182, 186, 189, 197, 207, 209, 212, 234, 240, 258-259, 264, 278, 326-327, 346, 364, 393, 405, 419
 Netherlands West Indies, 213-214
 Nicaragua, 2, 6, 48, 68, 79, 109, 120, 164-167
 Nickel, 78, 84, 191, 193, 243, 323, 332, 339
 Nitrates, 81, 87, 469, 471-475
 Northerners, 22, 128

O

Oases, 36, 98, 289, 435, 475
 Oats, 421-422, 446, 449, 471, 480

Oficinas, 469, 471
 Oiticica palm, 337
 Oranges, 150, 331, 363, 388, 421-422, 433, 446, 448, 457, 461, 463, 478
 Oriente, 107, 265, 273-275, 307, 317-319
 Orinoco, 12, 15, 91, 218, 220, 238, 256
 Orinoco Basin, 10, 16, 33, 238, 240-241
 Over-grazing, 29

P

Pampas, 12, 33, 50, 70, 74, 107, 418, 422, 427-432, 437
 Pampero, 443
 Panamá, 58, 81, 83, 102, 120, 170-173
 Panamá Canal, 5, 7, 109, 110-111, 122, 170-173, 287, 413
 Pan-American Highway, 91, 95-97, 221, 228, 266, 268, 281, 285, 447
 Pautanal, 15, 324, 399
 Paraguay, 1, 17, 33, 46, 48, 75, 83, 86, 92, 94, 104, 106, 113, 119, 300, 308, 390, 432, 451-466
 Paramos, 26, 251
 Paraná, 14, 16-17, 324, 432-433, 459, 463
 Pastoralism, 70-71, 132, 144, 147, 157, 166-167, 169, 183, 200, 234-235, 242-243, 253-254, 261-262, 266, 272-273, 318, 335-336, 388-389, 422-423, 427-430, 433, 438-439, 447-448
 Patagonia, 11, 13, 24, 33-34, 51, 71, 418, 436-441
 Peru, 9-10, 20, 28, 34, 37, 45-46, 58, 72, 77, 79, 82, 87-88, 104, 107, 112, 118, 121, 275-300, 321, 401
 Petit-grain, 457, 463
 Petrobras, 67, 84
 Petroleum, 83-84, 134, 136-138, 150, 182, 210, 213-214, 224, 241, 243-246, 252, 266, 273, 283-284, 289-290, 307, 319, 340, 436, 457, 472
 Pigs, 132, 147, 280, 333, 335-336, 388-389, 421, 423, 445, 457, 480-481
 Pimento, 199
 Plate river, 16-17, 33, 91, 416, 452
 Platinum, 80-81, 222, 224
 Porto Alegre, 390-391
 Potatoes, 75, 147, 149, 156, 160, 168, 220, 233, 259, 263, 266, 272, 279, 292, 312, 388, 456
 Puerto Rico, 8, 37, 45, 48, 103, 114, 179-180, 193-195
 Pulque, 147
 Puna, 280, 292

Q

- Quartz, 339, 394
Quebracho, 89, 422, 433, 457, 465-466
Quechuas, 303, 305
Quinoa, 233, 272, 279, 292, 312
Quito, 94, 266-268, 271-273

R

- Race, 42-47. *See also* Population
 Railways, 157, 170, 193, 227-228, 235, 266, 268, 271, 286, 306, 309, 343, 355, 381, 413, 427, 431, 447, 459, 465
Reduccioncs, 451, 480
 Religion, 52-54, 206, 304, 346-364, 385, 420, 455
Restingas, 324
Rhea, 71, 428
Rice, 131, 133, 149, 151, 163, 166, 169, 200, 259, 262, 266, 270, 279, 319, 331, 333, 388, 396, 406, 410, 422, 433, 435, 449, 456
Río de Janeiro, 5, 12, 41, 61-62, 109, 325, 327, 333, 342-343, 347, 349-350, 353, 360-361, 370, 375, 442
 Rivers, 13-17. *See also* Drainage and individual rivers
 Roads, 157, 193, 228, 234-235, 249, 266, 268, 285, 309, 318, 343, 381, 426, 447, 459
 Rubber, 220, 234, 236, 261, 280, 295-297, 318, 336, 378, 405, 407-410

S

- Saint Kitts, 203-204
 Saint Lucia, 203, 205-206
 Saint Vincent, 203, 205-206
Saladeros, 446, 448
Salars, 313
Salt, 136, 191, 223, 226, 243, 270, 370, 426, 472
 Salto Grande Project, 86, 448
São Francisco, 13-14, 16, 92, 343, 374, 381
São Paulo, 61, 94, 327, 336, 340, 342-343, 347, 349-350, 360-362, 370, 375, 386, 396
Santiago, 62, 467, 474, 478-481
Savanna, 28-29, 30, 33, 51, 150, 152, 194, 235, 258, 262, 269, 318, 462
Selvas, 31, 84, 273, 297, 299, 402-404
Serras, 374-375, 377, 381
Sertão, 373-374, 377-378, 398

- Sheep*, 132, 273, 280, 292, 313, 333, 335, 387, 423, 430, 437-439, 445, 471, 481-482, 484
 Shifting cultivation, 72, 248, 260, 318, 334, 387, 410, 412
Sigatoka disease, 165, 221
Silver, 79-80, 101, 134, 149, 151, 159, 163, 222, 263, 276, 284, 293, 314, 339, 418, 472
Sisal, 74
 Social problems, 52-61
Soil, 34-37, 50, 73, 146, 155, 159, 204, 207, 323, 365, 469
 Soil erosion, 37-41, 127, 248
 Subsistence agriculture, 64, 71-73, 155, 157, 396, 399, 463
Sugar-beet, 446, 478-479
Sugar-cane, 63, 131, 133, 141, 149, 163, 166, 169, 171, 182-185, 188, 190-193, 199, 203, 206-207, 209, 212-213, 220, 231, 251, 259, 279, 289, 296, 316, 319, 328, 332-333, 356, 365-368, 396, 406, 422, 435, 462
Sunflowers, 74-75, 316, 421, 446, 449, 471, 478
Sulphur, 81, 134-135, 426, 469, 472
Surazos, 318

T

- Taboleiros*, 365
Tagua nuts, 270, 280, 298
Tegucigalpa, 163-164
Tehuantepec peninsula, 6, 22, 133
Temporal, 158
 Terracing, 37-38
Terra roxa, 36, 41, 323, 348, 351, 384
 Textile industries, 144, 267, 282, 326, 371, 391, 481
Tierra del Fuego, 83, 468, 474, 482, 484
Tierra caliente, 26, 128, 150, 155, 239-240, 265
Tierra fria, 26, 128, 155, 239, 265, 271
Tierra nevada, 265
Tierra templada, 26, 128, 155, 239-240, 251, 265
Tin, 63, 76, 79, 98, 110, 300, 305, 307-309
Titicaca lake, 15, 93, 96, 286, 294
Tobacco, 74, 131, 147, 169, 182, 199, 203, 207, 220, 247, 263, 270, 296, 312, 316, 331-332, 365-366, 388, 410, 422, 462, 471
Tobago, 208, 211
Toltecs, 122

Tonka beans, 255
 Toquilla palm, 234, 267
Tormenta, 443
Tourism, 141, 152, 186, 200, 211, 215-216, 434, 436, 449, 470
 Trinidad, 108, 196, 208-211
 Tung oil, 434
 Tungsten (wolfram), 78, 80, 135, 307, 332, 357, 384, 418, 426
 Turkey, 71

U

United Fruit Company, 156, 162, 164-165
 Urbanism, 61-62
 Uruguay, 28, 41, 43, 46, 50, 56, 58, 61, 65-66, 70, 75, 83, 88, 93-94, 110, 119, 321, 326, 390, 441-451

V

Vales unidos, 365
 Valorisation, 355-356
 Vanadium, 78, 80, 280-281, 284
Vaqueiros, 377
 Venezuela, 13, 40, 47, 63, 66-67, 75, 83-84, 94, 98, 102, 109, 117, 236-256, 321
 Vicuna, 280, 313
 Vines, 333, 422, 435-436, 440, 479
 Virgin Islands, 8, 103, 108, 203, 205
 Volcanoes, 8-9, 154, 158, 165, 168, 212-213, 272, 480

Volcanic activity, 9, 125, 145, 204
 Volcanic soils, 36, 50, 156, 159, 169, 207, 323
 Volta Redonda, 359-360

W

Water resources, 85-86, 133, 141, 146, 289
 West Indies, 2-3, 5, 8, 37, 42, 55, 59, 83, 100, 117, 174, 179-216
 Wheat, 143, 233, 247, 266, 272, 279, 294, 316, 420-421, 435-436, 446, 449, 456
 Windward Islands, 205-207
 Wool, 88, 98, 280, 293, 336, 423-424, 438, 445, 471, 482, 484

X

Xarque, 389
 Xerophytic vegetation, 34, 143, 315, 438

Y

Yerba maté, 336, 390, 422, 457, 463
 Yucatán, 28, 37, 122-123, 125, 127
Yungas, 302, 315-317

Z

Zambos, 45
 Zinc, 79-80, 134-135, 143, 223, 263, 280-281, 284, 293, 307, 314, 332, 357, 426, 436, 441
 Zonda, 443

